



SMITHSONIAN Zookeeper

Published by **FRIENDS OF THE NATIONAL ZOO**
MAY | JUNE | 09

Demystifying Clouded Leopards

- » **MACAWS in the Wild**
- » **College CONSERVATIONISTS**
- » **Ready for ZOOFARI**



Good day.

Great day.



MAY | JUNE | 09 | Vol 38, No 3

FEATURES

LISA WARE/NZP

Finding the Silver Lining

The Smithsonian's National
Zoo celebrates the latest
birth of two clouded leopard
cubs—signifying hope for this
elusive species.

16 Fading Brilliance

With the declining populations of wild macaws,
the natural world is losing some of its color.

20 Living Classroom

College students spend a semester living
and learning about conservation at the Zoo's
Virginia campus.




SMITHSONIAN Zoogoer



is the dedicated partner of the Smithsonian's National Zoological Park. FONZ provides exciting and enriching experiences to connect people with wildlife. Together with the Zoo, FONZ is building a society committed to restoring an endangered natural world. Formed in 1958, FONZ was one of the first conservation organizations in the nation's capital.

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On the cover: The Zoo has succeeded at breeding the rare and beautiful clouded leopard (*Neofelis nebulosa*). Photo by Jessie Cohen/NZP.

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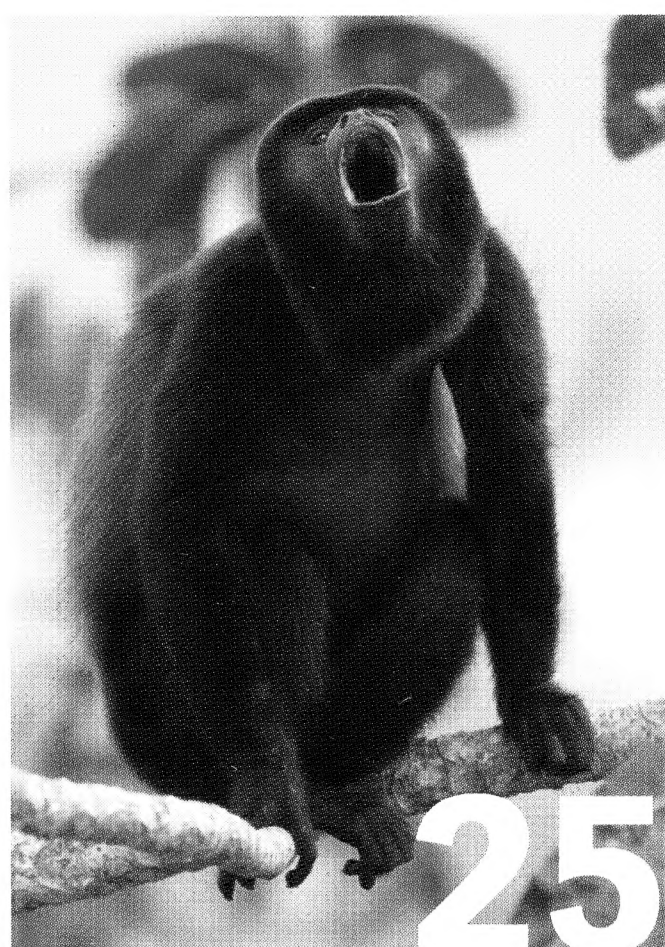


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25

3 From the Zoo

Letter from Smithsonian's National Zoo former director

4 From FONZ

Letter from Friends of the National Zoo executive director

5 Zoo News

Giant anteater birth, baby gorilla name, clouded leopard cubs, elephant shrew, FONZ Board nominations

9 How Do You Zoo?

Paul Pallansch makes exhibit creations look natural.

25 Animalia

Return of the night heron, loud monkey, hard-working sloths, mysterious eye

26 Creature Feature

The mighty little mantis shrimp

28 Science Scene

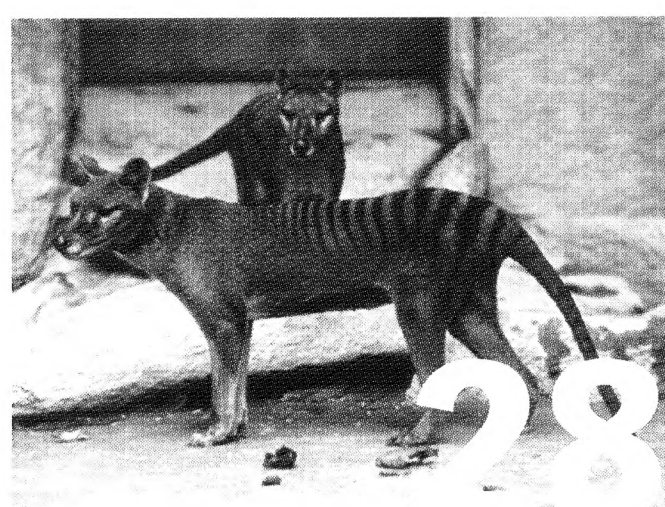
Turning a light on fireflies, learning from Tasmanian tiger DNA

29 FONZ

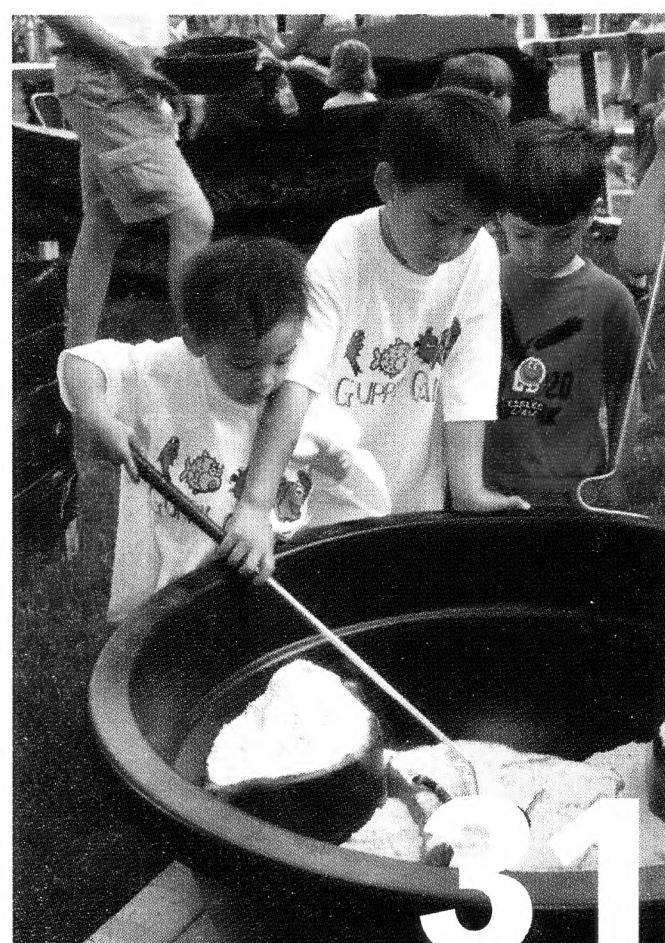
ZooFari, Guppy Gala, classes, and thanks to donors

36 Zoo View

Solomon Island leaf frog eggs



28



31

A SPECIAL PLACE

ON JANUARY 13, I RECEIVED THE HIGHEST HONOR OF MY LIFE:

a personal phone call from the President of the United States, asking me to serve in his administration as director of the U.S. Office of Personnel Management. Although I knew it would be difficult to leave a position I dearly love, I was raised to believe that when your nation calls, the answer is always “yes.”

Twenty years ago, I told someone that working at the Smithsonian’s National Zoo would be my dream job—and I was right. This is a special and magical place. I’ve enjoyed every minute and aspect of my service here as the Zoo’s director. I’ve loved getting to know the animals, the staff, the many volunteers, and the visitors. Anyone fortunate enough to spend time at the Zoo must consider himself truly blessed.

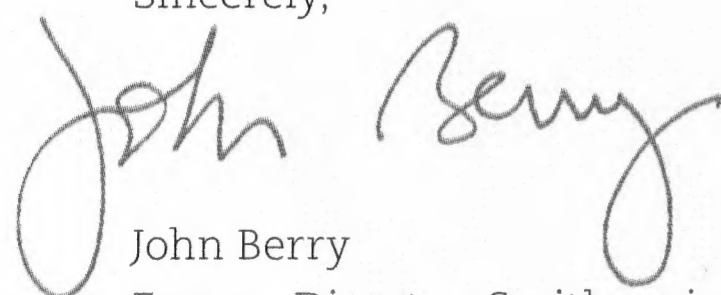
I’m proud of what we’ve been able to do together for the past three-and-a-half years, and I wish I had time to do more. We’ve achieved one of my top priorities: securing the funds to make the Zoo fire-safe for the public, the staff, and the animals. We are also well on our way to creating Elephant Trails, a world-class habitat that will support our leadership in Asian elephant conservation. We have forged a new partnership in conservation education with George Mason University (see “Living Classroom,” page 20). We’ve constructed a cheetah breeding facility at our site in Front Royal, Virginia. An exciting new seal and sea lion exhibit renovation is in the works. In addition, we have embarked on a scientific initiative to conserve highly threatened amphibians in Panama, which is showcased in our newly refreshed Amazonia exhibit. Perhaps less exciting, but just as important, has been our successful completion of a strategic plan and master plan for our Capital facility for the next 20 years.

I’m proud of the people who make the Zoo such a special place. Our employees are the best, and I believe we have one of the strongest management teams of any nonprofit in the Capital. Our volunteers and members are dedicated and supportive, despite the economic downturn, for which we’re extremely grateful. Every one of our Board of Directors—among the finest in the community—is passionate about our conservation mission.

I’m confident that Steve Monfort, whom Smithsonian Secretary Wayne Clough has named as the Zoo’s acting director, will continue our forward movement without missing a step. I know Steve well, and I respect him enormously. He’s a 23-year veteran of the Zoo, a Ph.D., a veterinarian, a great manager and people-person, and a brilliant guy who cares deeply about this institution. Steve has embraced the challenge before him and will do an outstanding job.

I take my leave feeling certain that the Zoo’s best days are ahead. As a D.C. resident, I will continue to visit and support the Zoo—as I have my whole life. I look forward to seeing you around Olmsted Walk.

Sincerely,



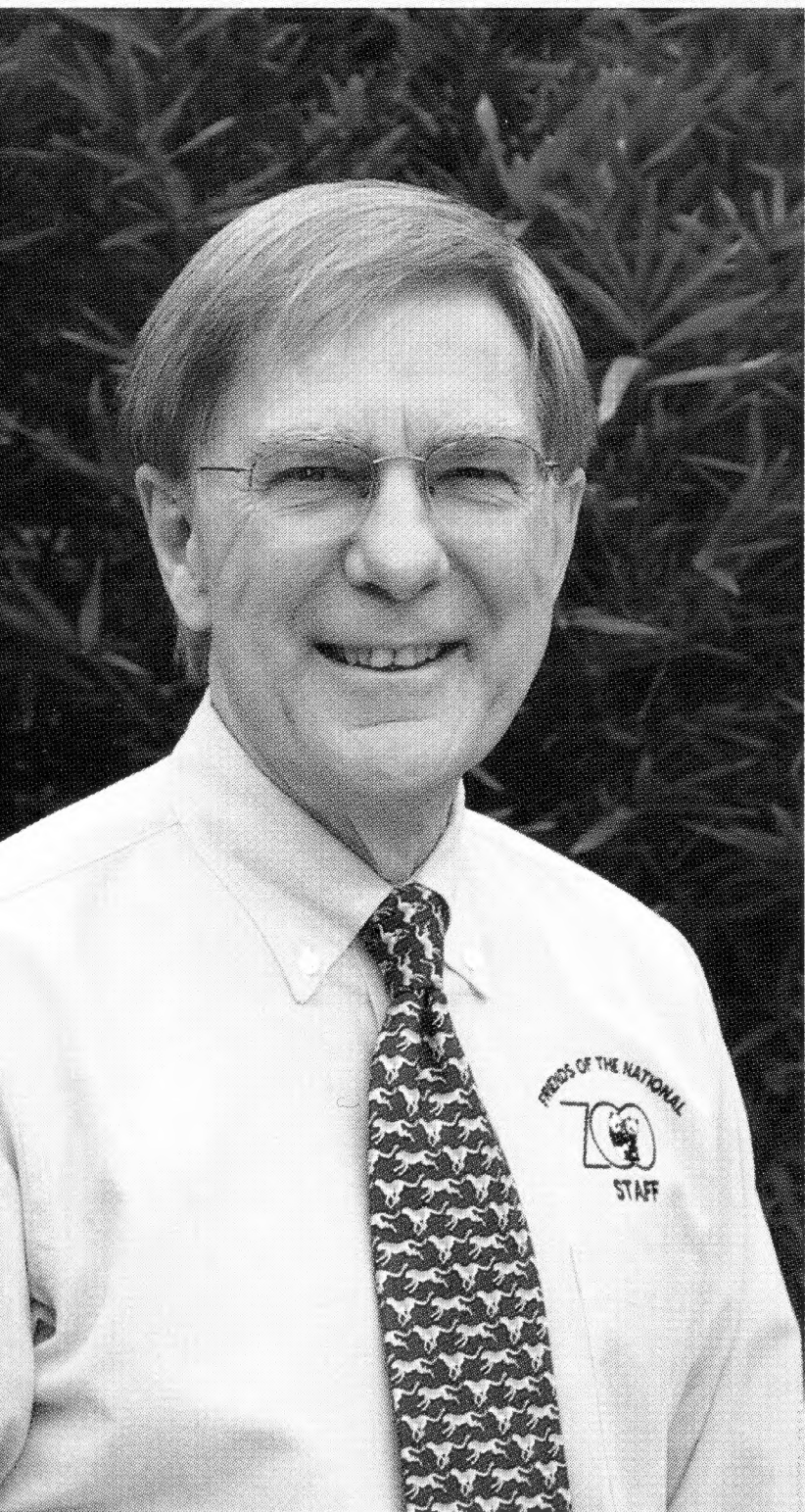
John Berry

Former Director, Smithsonian’s National Zoological Park



MEGHAN MURPHY/NZP

A TASTE FOR CONSERVATION



JESSIE COHEN/NZP

MAY IS A GREAT TIME TO ENJOY THE SMITHSONIAN'S NATIONAL ZOO, not just because the flowers are blooming and the weather is warm, but because on May 14 we celebrate our most delicious event of the year: ZooFari!

Much more than just a spring tradition, this premier culinary event includes fabulous food from about 100 of the area's finest restaurants, fine wine from 15 world-class wineries, and wonderful entertainment—all within the beautiful backdrop of the National Zoo. Our participating restaurants tell us it's their favorite restaurant event of the year—a high-value event not to be missed! They should know, as they have been generously joining us at ZooFari for more than 25 years.

A big part of this year's ZooFari is a more engaging, interactive silent auction. An auction team will highlight the many special items in this year's auction, from a haircut by a celebrity hair stylist to fabulous getaways to a restaurant-sponsored cooking class. We will also offer an expedited registration and checkout process. Can't wait? A special online auction is available now at www.fonz.cmarket.com, where you'll have the ability to purchase items in advance, as well as preview items only available at ZooFari itself.

This year's theme, "Elephant Affair," will be the first of several occasions to celebrate Asian elephants. The first phase of our Elephant Trails project opens later this summer, providing new habitat, new viewing areas, and a new elephant trek. Proceeds from ZooFari go a long way in advancing the work of the National Zoo.

Thanks to the generous support from sponsors, restaurants, wineries, volunteers, and several thousand guests, last year's event netted nearly \$400,000. Over the last 25 years, ZooFari funds have updated our facilities and exhibits, strengthened education and outreach programs, supported veterinary interns as well as post-doctorate and research fellows, advanced the National Zoo's leadership in wildlife conservation, and been a key component of all that we do here at the Zoo.

Please join us this year at ZooFari. If you've never attended before, this is the year to come and bring your friends. Please note that you must be at least 21 years old to attend. To learn more about the event and purchase tickets, please visit our website at www.fonz.org/zoofari.htm.

And don't forget Guppy Gala on June 12, our annual family-friendly event that offers a variety of activities to bring out the child in each of you.

Thank you for your continued support. We hope to see you and your friends at the Zoo. Be sure to remind them that we are a free zoo and a perfect place to visit all throughout the year.

Sincerely,

Bob Lamb

Executive Director, Friends of the National Zoo

ANIMAL NEWS

The Smithsonian's National Zoo's baby western lowland gorilla (*Gorilla gorilla gorilla*) now has a name: Kibibi (kee-BEE-bee), which means "little lady" in Swahili. More than 10,000 people voted in a public naming contest.

Born in January, little Kibibi is thriving and growing; she had developed four teeth by the time she was two months old. At birth, a baby gorilla is about four or five pounds—smaller than a typical baby human—but a baby gorilla develops twice as fast as a human infant.

With each passing day, Kibibi grows more interested in things around her—especially food.



ALL PHOTOS BY MEGHAN MURPHY/NZP



Bye-bye to Balawat! In April, the Zoo's three-year-old **sloth bear** (*Melursus ursinus*) was sent to Ohio's Akron Zoo, on loan for breeding purposes. Born at the Zoo in 2006 to Hana and Merlin, Bala delighted visitors with his curious and playful behavior.



A BABY GIANT ANTEATER

(*Myrmecophaga tridactyla*) arrived at the National Zoo on March 12, only the second anteater ever born at the Zoo and the first male.

So far, the mother, Maripi, has shown excellent maternal instinct and is very patient as the baby nurses and negotiates various techniques of climbing onto her back. Soon after birth, a baby anteater begins the long climb up to the bristly crest of the mother's back, where it is perfectly camouflaged and safer from predators. It will ride its mother's back for up to a year.

The father, Dante, is separated from mother and baby and plays no part in the rearing of offspring. This is the second baby for Maripi and Dante. In 2007, Maripi gave birth to a female, Aurora, who now resides at the Zoo Parc de Beauval in France. Maripi and Dante have lived at the National Zoo since 2006 and are on loan from the Nashville Zoo.

In the wild, giant anteaters live in the grassland savannas, swamps, humid forests, and wetlands of Latin America, from Belize to Argentina. At the Zoo, they can be viewed in their exhibit near Lemur Island. To watch a video and see photos from the baby's first day outside, go to www.fonz.org/anteater.htm.



JESSIE COHEN/NZP

TINY BABIES, BIG PAWS!

Two long-awaited clouded leopard (*Neofelis nebulosa*) cubs were born at the Zoo's Conservation and Research Center (CRC) in Front Royal, Virginia, in March. The results of extensive research in clouded leopard reproduction, the cubs are the first such births for the Zoo in 16 years, (see "Finding the Silver Lining," page 10). The two male cubs are being hand-reared by Zoo staff at CRC to optimize their chances of survival and future breeding. The cubs' parents, who bred naturally, live as a compatible pair at CRC.

National Zoo visitors can see a second pair of clouded leopards—Tai and Mook—on Asia Trail. Hand-reared before they were introduced as cubs, Tai and his mate were born in the United States in 2002. The couple arrived at the Zoo in 2006, and is often seen snuggled together in a bed of hay near the front of their exhibit.

EXHIBIT NEWS

» Upon entering the research huts at Amazonia's new **Amphibian Alert** exhibit, you can come face to face with some of the world's most fascinating creatures. Slither into the world of the Western tiger salamander, marvel at an odd aquatic caecilian, or leap into the life of the vibrant lemur frog. These and many other amphibian species will be on exhibit this spring, along with interactive exhibits and insights from the Zoo's leaders in amphibian conservation. Come learn how chytrid fungus and human impacts on the environment are threatening amphibians all over the world.

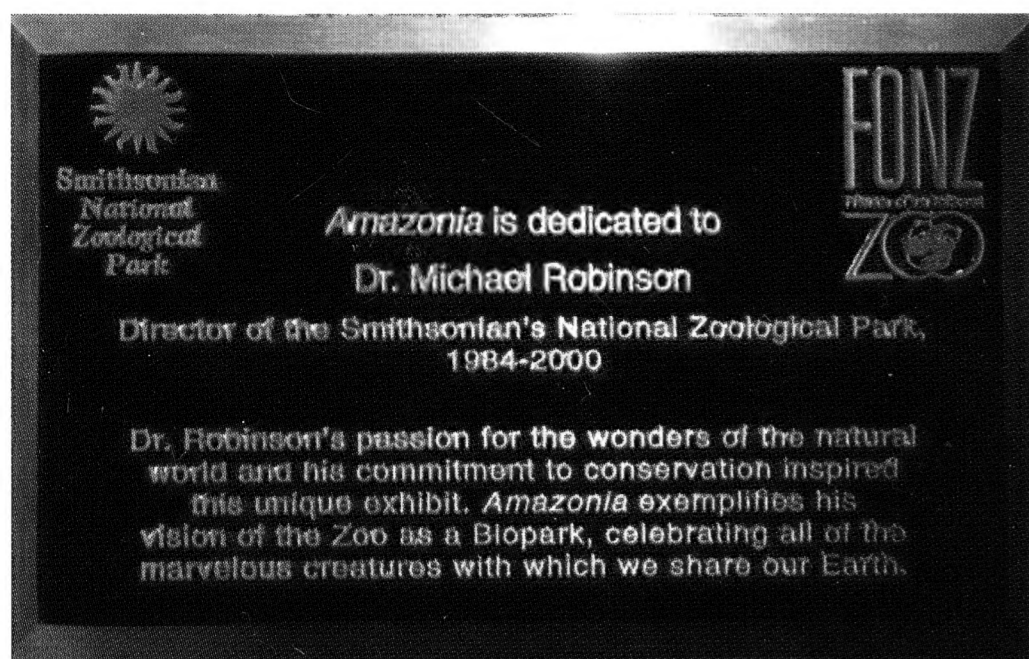
A short hop across from Amphibian Alert is Amazonia's new Science on a Sphere, where a suspended globe displays images of our amazing planet.

» You can also catch a frog film at Amazonia. The award-winning film, **"Frog, Chemical, Water, You!"**, examines the relationship between the chemicals we put in our environment and the decline of amphibians worldwide. Directed by Jennifer Grace, a Montana State University master's student, the 17-minute film runs continuously in the Amazonia Science Gallery's seminar room. It was produced by Shirlee Tan, Christiana Grim, and National Zoo biologist Miles Roberts. Thank you to the Smithsonian Women's Committee for funding the project.



LEMUR FROG, MEGHAN MURPHY/NZP

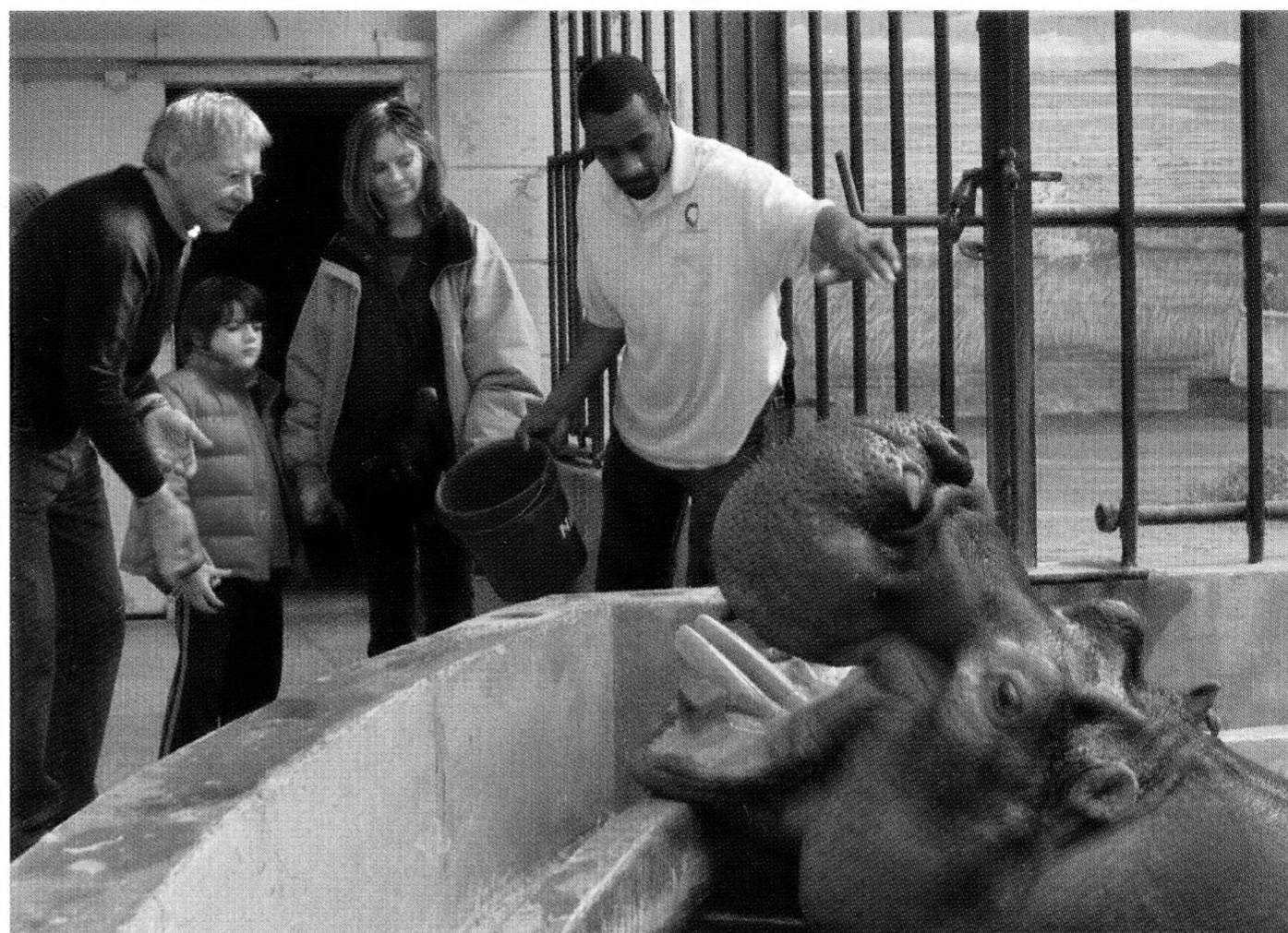
LEARN ABOUT ZOO VETS Want to learn how the Zoo's veterinarians care for animals? Visit our website to read the latest Spotlight on Vet Medicine at <http://nationalzoo.si.edu/goto/vetmedicine>.



MEHGAN MURPHY/NZP

A NATURAL LEGACY

If you enjoy Amazonia, Think Tank, and the Invertebrate Exhibit, then stop by Amazonia to see a new plaque honoring Michael Robinson, who helped make these buildings possible during his tenure as the National Zoo's director from 1984 to 2000. Robinson believed the Zoo's mission should be to teach the public about the relationship between animals and the environment. He laid the groundwork for a "bio-park" that would provide visitors with the opportunity to see animals in exhibits that closely resembled their natural habitats.



JESSIE COHEN/NZP

ACTORS HARRISON FORD AND CALISTA FLOCKHART, along with her son Liam, met the Smithsonian's National Zoo's Nile hippopotamus, Happy, during a visit in April. Ford had a good time feeding the 5,000-pound hippo with animal keeper Jay Tee Taylor (right). The threesome also visited the Zoo's giant pandas, great cats, and primates, including baby gorilla Kibibi. Ford is an active supporter of wildlife conservation.

FONZ CALL FOR BOARD NOMINATIONS

In accordance with our bylaws, the Friends of the National Zoo Board of Directors is now soliciting nominations from the membership for the 2010 FONZ Board.

The volunteer Board plays an essential role in shaping FONZ's future direction, and we rely on our members to recommend individuals with the appropriate skills, talents, and leadership abilities to guide our efforts to connect people with wildlife and to support the important work of our partner, the Smithsonian's National Zoological Park.

Please assist us by nominating individuals (or yourself) who would add value to the FONZ Board, and who would be interested in this special community service opportunity. Nominations will be reviewed by the FONZ Board Oversight and Nominating Committee, and the names of the selected nominees will be forwarded to the FONZ membership for election consideration.

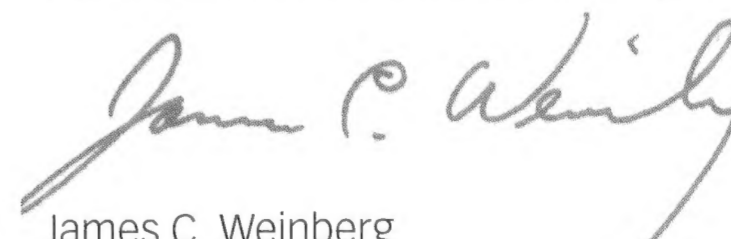
The criteria by which potential candidates are considered and judged include:

- Strong interest in supporting zoological education, research, and conservation in accordance with the FONZ purposes
- Fundraising or friendraising ability to help FONZ and the National Zoo achieve their development objectives
- Demonstrated leadership abilities
- Demonstrated experience and/or skills that would directly benefit FONZ leadership—both staff and Board—and the FONZ membership
- Willingness and ability to commit significant time to FONZ's scope of work and FONZ Board activities
- Current dues-paying members of FONZ

Much of the FONZ Board's work is accomplished by three standing committees (Executive, Finance and Audit, and Board

Oversight and Nominating), and through task forces and other committees. All Board members are expected to serve and fully participate on committees and are expected to attend one or more monthly meetings or functions.

Nominations for the FONZ Board of Directors are only accepted from current dues-paying members, must be submitted on the official FONZ nomination form, and must include a comprehensive biography of the nominee. To receive an official nomination form, and/or to discuss Board service with me or a member of the Board, please call 202.633.4379. The deadline for submitting nominations for the 2010 FONZ Board of Directors is June 5, 2009.


James C. Weinberg
President, FONZ Board of Directors

Mark Your Calendar

May 14 ZooFari offers a unique chance to sample fine food, wine, and entertainment

www.fonz.org/zoofari.htm

May 28 Catch a lecture by wildlife journalist Will Stolzenburg

www.fonz.org/lectures.htm

June 12 Guppy Gala offers an evening of fun for kids

www.fonz.org/guppy.htm

Connect With Us

Want to receive the latest information from Friends of the National Zoo—and help conserve resources?

Provide FONZ with your current email address, and we will send you twice-monthly electronic newsletters, member email updates, and other Zoo news. Please visit www.fonz.org/memberemails.htm to send us your information.

LOOK FOR THE FONZ MEMBER SECTION STARTING ON PAGE 29 FOR INFORMATION ABOUT EVENTS, CLASSES, CAMPS, AND MORE! Be sure to turn to the FONZ section in each issue of *Smithsonian Zoogoer* to stay up to date on the latest exciting happenings at the Smithsonian's National Zoo.

Stuff. Stitch. Love. Repeat.



Create-a-Critter
FACTORY

Bring an animal to life at the Zoo's new Create-a-Critter Factory. Choose from pandas, lions, monkeys, tigers, elephants, and more. Fill them with stuffing and add a wishing star. Create-a-Critter packages include an animal, trading card, wishing star, birth certificate, and reusable carrying box. Come and make a furry friend of your own. Then come back and do it all again.

ART IMITATING LIFE

Visitors strolling down Asia Trail adore the ginger-colored red pandas, shaggy sloth bears, and playful otters. But they rarely notice the carefully sculpted rocks and waterways that mimic the animals' wild habitats. That's just what exhibit specialist Paul Pallansch wants. He builds and sculpts bits of nature and other features for Smithsonian's National Zoo exhibits using cement, resin, paint, metal—and an artist's touch.

"Everything I do is contrived, but the idea is to make it look natural," Pallansch says. When he created extra rocks and ledges to keep one wayward red panda from escaping, Pallansch sprayed the rocks with 12 coats of dilute paint and speckled them with a toothbrush. His work matched the older rocks so well that Senior Curator Ed Bronikowski told him, "I went to look at your rock work, and I couldn't find it."

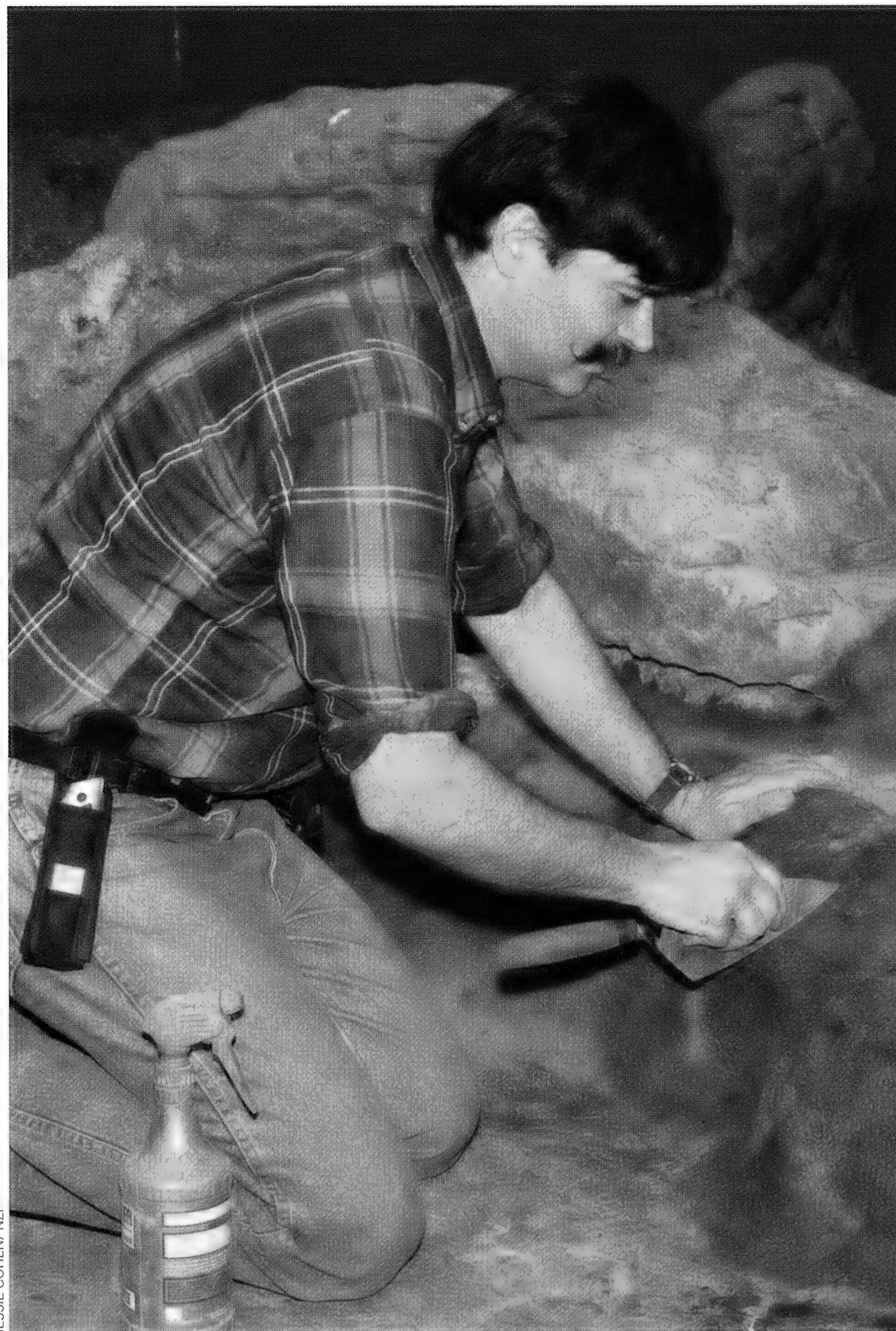
Pallansch began shaping cement "stone" when he re-designed a monitor lizard exhibit in the Reptile Discovery Center, but he also rocks at casting objects in resin. He made the acacia log dotted with gooey-looking sap near the kori bustard exhibit from resin. He also captured a fishing fly made from kori bustard feathers in durable resin so that it could handle outdoor wear and tear.

Pallansch says Zoo exhibits must be hardy and, more importantly, safe for animals and visitors. The Zoo's safety office must approve building materials for each exhibit. "That means the safety office, all the curators, the director, the pathologists, and the vets—everybody who has any influence at all concerning animal care," Pallansch says.

When Pallansch added rocks for a waterfall between the fishing cat exhibits last autumn, he bolted every rock down so Zoo staff could remove them but visitors couldn't. "Somebody might pick one up and throw it through the glass," he says. Not only could a stray rock cause damage, it might harm the animals.

Pallansch shifts between maintaining exhibit parts and crafting them—his favorite part. "I'm actually a model maker posing as an exhibit builder," he says. Before joining the Zoo about three years ago, Pallansch modeled buildings, human shapes, and natural forms such as an oyster bar full of anemones and feathery fan worms. Pallansch studied commercial art before computers handled much of the design work, and he taught himself many of the sculpting and painting techniques he uses at the Zoo. Come check out his handiwork—if you can find it.

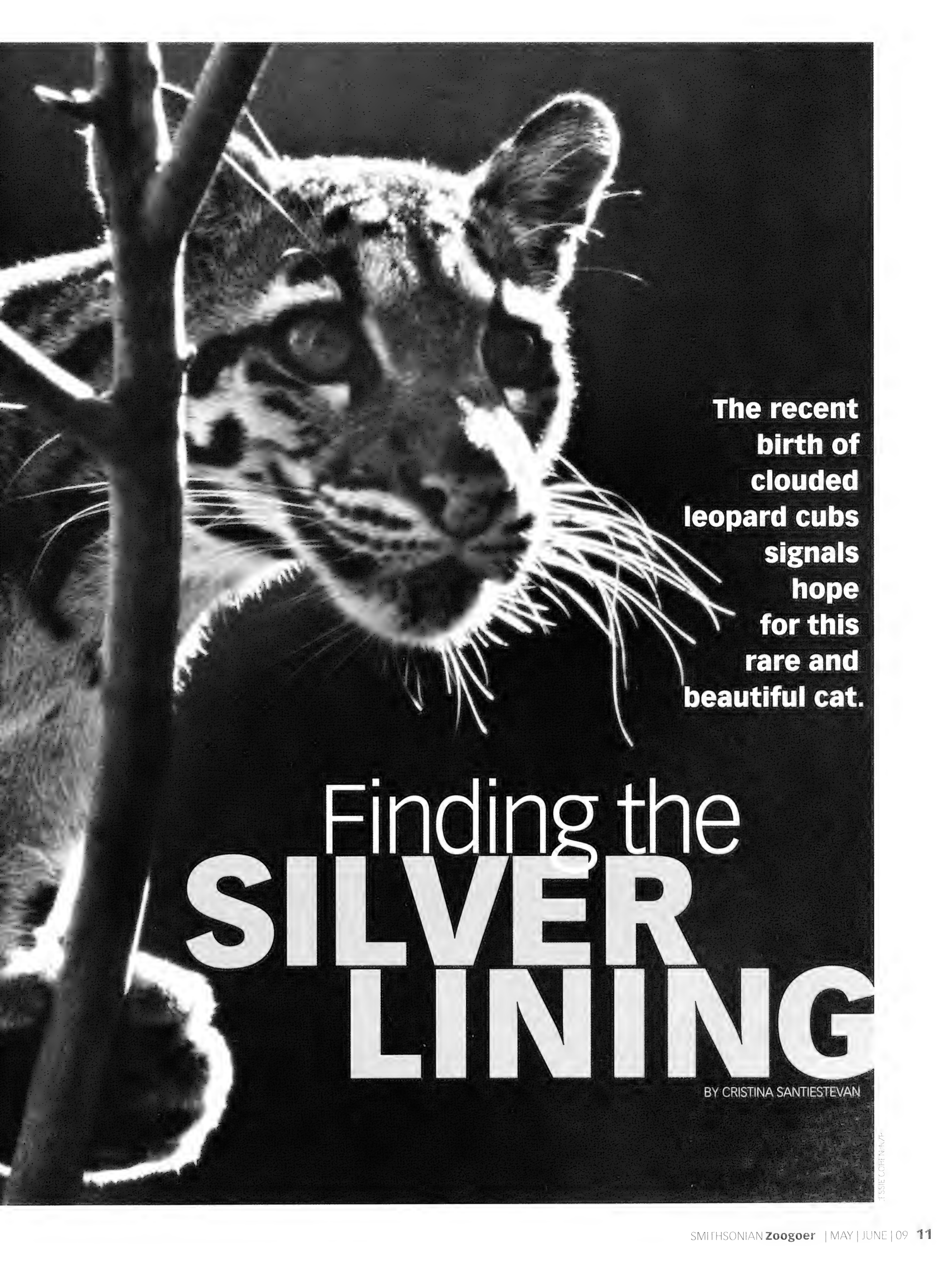
— HAYLEY RUTGER



JESSIE COHEN/ NZP

» In each issue of *Smithsonian Zoogoer*, this "How Do You Zoo?" page will showcase someone who works at the National Zoo. Learn more about careers at the Zoo by visiting the How Do You Zoo? exhibit in the Zoo's Visitor Center. Children ages five to ten can get a hands-on feel for different jobs at the Zoo. The exhibit is open most weekends from 10 a.m. to 4 p.m.





**The recent
birth of
clouded
leopard cubs
signals
hope
for this
rare and
beautiful cat.**

Finding the **SILVER LINING**

BY CRISTINA SANTIESTEVA

— JESSIE COHEN/WWF

Finding the Silver Lining

VIRGINIA IS A LONG WAY FROM THAILAND, and the Blue Ridge Mountains are a far cry from the tropical forests of Southeast Asia. The climate, the landscape, and even the birds in the sky are different. But there is one common link: the clouded leopard (*Neofelis nebulosa*). This tropical cat's last and best hope could be here, at the Smithsonian's National Zoo's Conservation and Research Center (CRC) in Front Royal, Virginia.

Once a breeding and training facility for cavalry horses, CRC is now home to some of the world's most endangered species. It is here, among old barns and modern laboratories, where JoGayle Howard is making a stand for the clouded leopard. Howard, a veterinarian and reproductive scientist at the National Zoo, is battling time and threats to save the species from a decline that could end with extinction. But clouded leopards are reluctant partners in their own salvation. Difficult, secretive, and unlike any other cat, they defy most scientists' attempts to understand them and, possibly, save them.

But Howard can now claim to have demystified some aspects of clouded leopard reproduction. In March, one of the clouded leopards at CRC gave birth to two male cubs—the first such births at the Zoo in 16 years, and the first clouded leopard cubs born in the North American Clouded Leopard Species Survival Plan in six years. “We’re very happy—it’s been a long road,” says Howard. “These valuable cubs represent many years of Zoo research on clouded leopards.”

The National Zoo has been working with clouded leopards at CRC since 1978, with the ultimate goal of breeding these cats to create a genetically diverse population and perhaps save the species. “We’re never going to save a species we don’t understand,” explains Howard. Thus—from basic behavior to complex reproductive physiology—Howard has made it her goal to understand clouded leopards. “I feel like we’ve come a long way,” she says. “But we still have much more to learn.”

Frightfully rare and extremely difficult to study, the clouded leopard's evasive



MEGHAN MURPHY/NZP

disposition does not exactly encourage conservation projects. In fact, the National Zoo's clouded leopard breeding and research program is the only one of its kind. “If we weren’t doing this, nobody would be doing this,” says Howard. “We are the stewards of this species.”

The Ghost of the Forest

To describe the clouded leopard as secretive would be an understatement. This cat is so elusive that dedicated researchers spend years in the forest without seeing a single clouded leopard; their current range can only be guessed and population estimates vary wildly. “No one has a clue how many clouded leopards exist,” says Howard.

“There could be 10,000 wild cats scattered across Southeast Asia and the surrounding islands.” But, perhaps more likely, there could be less. Significantly less.

After about a decade of trying, researchers have radiocollared and tracked only six individuals. Scientists have found that these cats—three males and three females—are most active near dawn and dusk, travel far through territories nearly triple the size of any other species of leopard's, and sometimes venture beyond the forest canopy's protective cover to explore grasslands and other habitats. Despite these results, data from six cats hardly represents conclusive results. Until researchers collar and track more clouded leopards, our understanding of their wild behavior is left mostly to informed speculation.

What we do know about clouded leopards suggests they are masters of acrobatics and agility. These leopards are the smallest of the big cats, weighing just 30 to 50 pounds and measuring about five feet long. Their short legs, oversized paws, and long tails—which account for half their length—help them balance on small branches, and their flexible ankles allow them to run down trees headfirst. The cats are strong enough to leap up to 12 feet between trees, and can easily climb along branches while hanging upside down. Their canine teeth—the longest of any cat's relative to body size—suggest they may use this strength to overpower relatively large prey, such as deer and wild boar.

Combine this agility and strength with their camouflage coat, and it's no surprise clouded leopards are as elusive as ghosts. But the habits of a ghost aren't enough to protect clouded leopards from their greatest threat—poachers who profit from selling the cats' coveted pelts. Camera traps—tree-mounted and motion-activated cameras used by researchers to record wildlife activity—occasionally snap photographs of wild clouded leopards. Unfortunately, “every roll of film has poachers



JANICE SVEDA/FONZ PHOTO CLUB

LEFT: First-time mother Jao Chu gave birth to two male cubs in March.
RIGHT: JoGayle Howard has dedicated more than 20 years to clouded leopard reproductive research.

on it,” explains Howard. “Illegal wildlife trade is probably the cats’ greatest threat in Thailand.” Clouded leopards are also hunted for food or to supply ingredients for the Chinese medicine trade.

Not Your Typical Cat

The cats’ mysterious nature wouldn’t present nearly as much of a challenge if they were like other cats. But their biology is so different from other species that standard feline reproductive procedures, such as hormone therapy and artificial insemination, do not work with clouded leopards. Most felines share some common traits, potential clues that help guide researchers in their work. Both cheetahs and house cats, for example, are induced ovulators. This means they release their eggs for fertilization only when they mate. Knowing this, National Zoo scientists can manipulate a female cheetah’s reproductive cycle to induce estrus (heat) and ovulation before an artificial insemination, which would dramatically increase the chances of success. To date, the Zoo’s cheetah breeding program boasts about a 50-percent success rate with artificial insemination (AI).

Clouded leopards follow much different reproductive cycles. These cats often



MEGHAN MURPHY/NZP

ovulate spontaneously, releasing their eggs after estrus even if no mating occurs. While this is not a problem with natural breeding—after all, clouded leopards have been procreating for years—spontaneous ovulation does make it very difficult to perform a successful AI. So difficult, in fact, that the Zoo has celebrated just one successful pregnancy resulting from artificial insemination in clouded leopards. Howard describes it as “luck” and suspects

the female was not cycling. The successful AI has never been repeated.

The lack of success is not for lack of trying—the Zoo’s reproductive scientists have been working to understand the reproductive physiology and hormonal cycles of these cats for two decades. After years of research, Howard has many answers but also plenty of questions. “They’re just the most difficult cat species to understand,” she says. Despite the challenges, Howard and others

Finding the Silver Lining

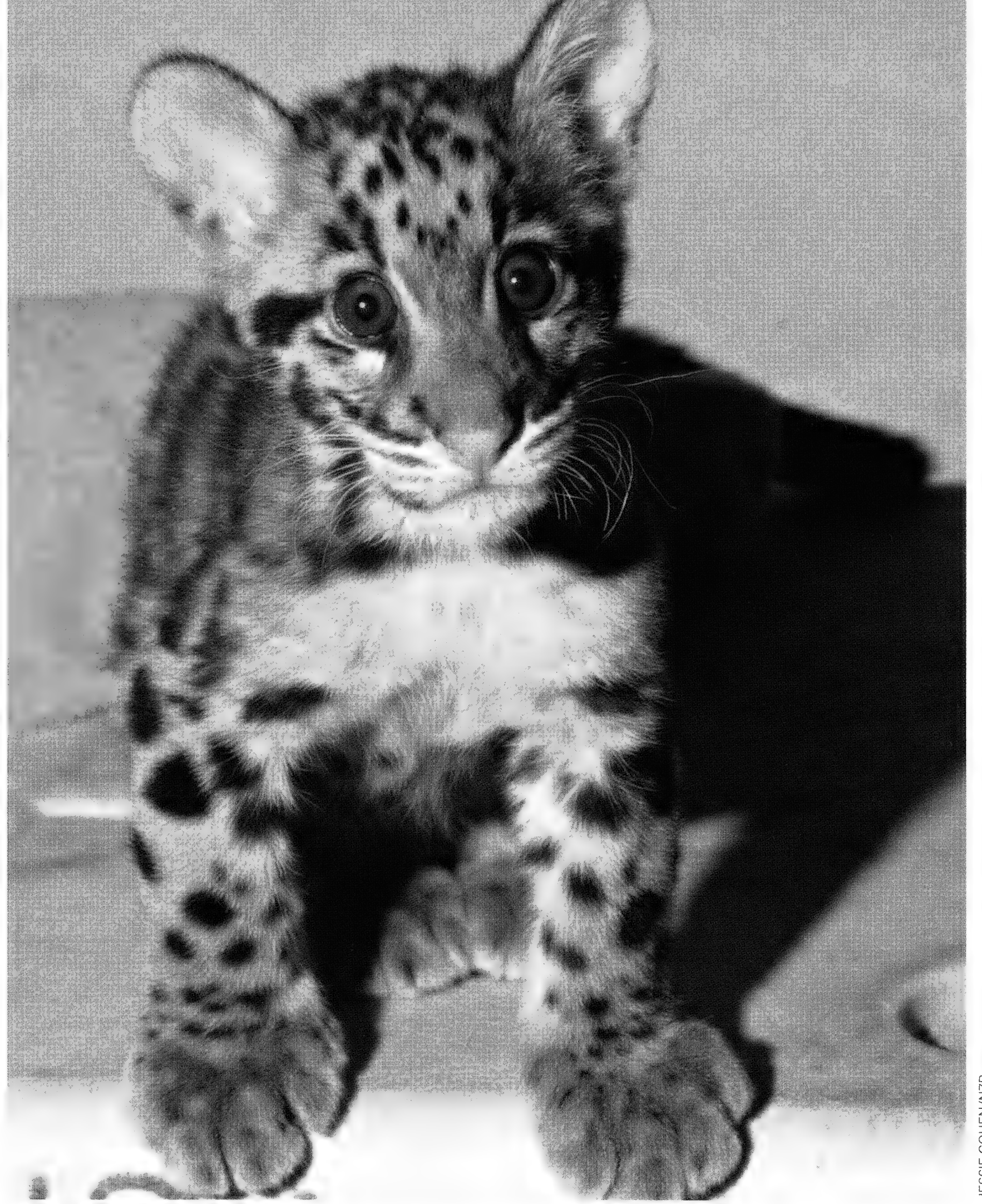
continue to look for answers. “Understanding how to control their cycle is critical before artificial insemination,” explains David Wildt, head of the National Zoo’s Department of Reproductive Sciences.

Howard has applied 20 years of research to the methods she is now using to artificially inseminate the clouded leopards. The most recent attempt to inseminate three of the cats—Nattie, Nelly, and JoGayle—utilized her latest methods. Since clouded leopards do not respond like cheetahs, she and graduate student Katey Pelican decided on a dramatically different approach: They stopped the reproductive cycle entirely. Using high doses of hormones, they temporarily halted the reproductive hormonal cycle for the three clouded leopard females at CRC. The cats were then given a second hormone to restart their cycle and induce a synchronized estrus, followed with another injection to induce ovulation. The three cats also were given extra doses of progesterone after the AI, which Howard hopes will help encourage and support a pregnancy. This strategy is often used in AIs with other spontaneous ovulators, including cattle, primates, and humans.

Since artificial inseminations are so difficult, many ask why the cats aren’t allowed to reproduce naturally. As is typical with this atypical cat, there is no easy answer. Male clouded leopards are often aggressive, and have a gruesome record of attacking, maiming, or killing potential female partners. The attacks can come suddenly and without warning, and often occur during the evening.

Scientists still do not know why male clouded leopards attack, but several graduate students at the National Zoo are studying the males’ behavior in hopes of identifying clues. One of the students is testing anti-anxiety drugs used in humans and domestic cats in an attempt to suppress male aggression. So far, Howard and her team have learned how to reduce the risk of fatal attacks by introducing males to their mates when they are six months old, allowing the pair to grow up together.

Hannibal and Jao Chu, the only compatible pair of clouded leopards at CRC, are proof that this technique works. Jao Chu is the mother of the newborn cubs at CRC. Both she and her mate, Hannibal,



JESSIE COHEN/NZP

are approximately two-and-a-half years old. Because the two were raised together and are now a bonded pair, they were able to breed successfully and become the parents of two cubs. A second pair of compatible clouded leopards—male Tai and female Mook—lives on Asia Trail at the Zoo, and they recently bred in March. Another pair—imported from Thailand like Hannibal and Jao Chu—lives at the Nashville Zoo.

It Takes a (Global) Village

Saving a species doesn’t occur in a vacuum, and clouded leopard success at the National Zoo requires input from many organizations that help with breeding efforts by supplying people-power and funds. “I don’t know how we could do it without collaborating,” says Howard, who is quick to list many partners, including the Nashville Zoo, the Point Defiance Zoo in Washington, the Khao Kheow Open Zoo in Thailand, and the Clouded Leopard Species Survival Plan, among others. “We become colleagues. We become friends.

The Zoo had many clouded leopard births decades ago. This cub was born in 1987.

We all have something different to offer the program,” she says.

Howard is justifiably excited about the Thailand Clouded Leopard Consortium and its recent breeding successes at Thailand’s Khao Kheow Open Zoo. The Consortium—born through a partnership between the National Zoo, Nashville Zoo, and the Zoological Park Organization of Thailand—has produced 33 surviving cubs since its inception in 2002. This remarkable success provides hope for clouded leopard breeding programs around the world.

Genetic diversity is one of the most important pillars of a successful captive breeding program. If the cats are not carefully paired with unrelated partners, the captive population could become dangerously inbred. The Clouded Leopard Species Survival Plan oversees clouded leopard populations in zoos worldwide, and makes recommendations for potential pairs based on the genetics and pedigree

of each cat. Since Thailand's cubs are only one or two generations removed from the wild, their genes are especially valuable. Several have already been transported to the United States, including CRC's Hannibal and Jao Chu.

Despite some challenges, such as losing two cats to avian flu in 2004, the Thai program is thriving. Of the 33 surviving cubs, 17 have been paired with compatible partners. Currently, two pairs are actively breeding at Khao Kheow, and another seven young pairs are successfully living together in Thailand and America.

Moving Toward a Brighter Future for Clouded Leopards

Howard poses a question: "How do you save a species?" The answer—one piece of information at a time—is simple, but not quick.

After decades of dedicated study, the Zoo's clouded leopard program has many hard-earned, valuable answers: Clouded leopards need tall, private enclosures that are separated from other pairs. Males should be introduced to their potential partners at an early age in order to reduce

aggression. Hand-reared cubs mature into confident, low-stress adults that are more likely to breed successfully.

But many questions remain, and Howard continues to search for answers wherever and however they might be found. At the National Zoo, her team is refining their techniques for artificial insemination. Across the Pacific, Howard and the Thailand Clouded Leopard Consortium will continue to study, breed, and hand-rear the cats at Khao Kheow Open Zoo. Aware of the mysteries surrounding their natural behaviors, Howard hopes to expand the Thai-based clouded leopard field programs. Recently, she and other collaborators from U.S. zoos and Thailand's Kasetart University initiated the first international meeting in Thailand about Asia's small cats. And, proof that Howard will look anywhere for clues, her team continues to import "huge coolers filled with frozen poop" from Khao Kheow. When analyzed for fecal hormones and DNA, the clouded leopard scat reveals valuable information about the cats' health, stress levels, reproductive cycles, and genetics.

And in Virginia, CRC is embarking on

an ambitious, multi-million-dollar project to construct new breeding and research facilities that will eventually house ten pairs of clouded leopards. Each unit will include two tall outdoor enclosures for climbing and exploring, with a connected indoor area. These new enclosures are necessary to support the National Zoo's clouded leopard program in the coming years, and to provide a home for the new cubs (to help, visit www.fonz.org/savecloudedleopards.htm).

"Most people don't understand what conservation is," explains Howard. "I like to think it's everything. It's the training. It's the science. It's the breeding. It's the field programs. You can't just do one little piece and hope to save a species. There's just no way."

How do you save a species? This is how. One answer, one success, one cub at a time. ▀

—CRISTINA SANTIESTEVEAN *writes about nature, science, and conservation from her home in the foothills of Virginia's Blue Ridge Mountains.*

TWO FOR TWO



JESSIE COHEN/ANP

It had been more than six years since the Clouded Leopard Species Survival Plan celebrated a clouded leopard birth in North America and 16 years since CRC had produced a cub. JoGayle Howard is delighted that 2009 marks the end of this dry spell.

Hannibal and Jao Chu, a young and devoted couple, produced their first cubs in March. "This is a huge success," says Howard. "We've demonstrated that clouded leopards that are hand-raised and paired at an early age can breed successfully."

Both clouded leopard parents were born in Thailand during the summer of 2006, and were introduced to each other when they were about six months old. The two grew up together, and are now the only compatible pair among CRC's ten clouded leopards. Just past puberty, Jao Chu and Hannibal began to behave amorously in December. Keepers were not sure whether they mated successfully until they noticed Jao Chu's wider girth in March.

Because female clouded leopards sometimes attack or eat their newborns, Ken Lang, mammal supervisor at CRC, rallied keepers, students, and other volunteers to watch over Jao Chu in the final days of her pregnancy. The team used video monitors to watch Jao Chu without disturbing her, all so they could remove the cubs from the enclosure immediately after birth. Perhaps because she is a first-time mother, Jao Chu delivered the cubs outside the warm nestbox. The cubs were quickly moved from the cold concrete floor, placed in a warm incubator, and fed by bottle. The two male cubs will continue to be hand-reared by CRC staff, not only to give them their best chances at survival, but to prime them to be cooperative breeders themselves down the line. The next step is to find suitable mates for these cubs.



For plummeting
macaw
populations,
humans hold
a bright future.

Fading Brilliance

BY HOWARD
YOUTH

These days, military macaws seem more myth than reality. Even though range maps show that the birds nest from Mexico to northwest Argentina, and even though their screeches seemingly wake the dead—military macaws (*Ara militaris*) have become notoriously hard to find.

Since I live in Ecuador, home to seven macaw species, I thought I'd try my luck at finding the military here. These goliath, emerald-green birds measure more than two feet long, and are known to nest in only one or two places in the country. I stacked the odds in my favor by hiring a guide, biologist Rudy Gelis. "They might be nesting right now," Gelis told me as we stood atop a ridge overlooking a sea of tropical forest flanking the Sumaco Volcano. Six months earlier, Gelis had hiked down to the nest site, a cliff face hidden amid the greenery. But he found the cliff holes bird-less. At perhaps just ten pairs, the Sumaco area's military macaw population is hardly robust. During our three days in the area, I saw several screeching military macaw pairs, always distant and always headed away from us. But I left feeling fortunate to have seen them at all.

Giants of a Declining Realm

Macaws, the world's largest parrots, are also among the most endangered. Fifteen species inhabit a variety of shrinking habitats—from lush tropical rainforest to arid woodland and palm-studded savanna—in Central and South America, and some parts of Mexico. The dual threat of habitat loss and their desirability as pets has led to their disappearance. Where macaws remain, their survival hinges on innovative ways to keep these parrots and their homes in place as humans continue to move into remaining wilderness areas.

There were once more wild macaws. Listed as critically endangered, the Spix's macaw (*Cyanopsitta spixii*) likely went extinct in the wild in 2000, when the last known male vanished in Brazil. Eighty or more birds, however, remain in captivity in aviaries around the world, many part of a breeding program that aims to reintroduce birds to Brazil. No such luck for another South American macaw, the glaucous (*Anodorhynchus glaucus*). This large blue bird has not been seen in the wild in about 50 years, and there are no known captive birds. Conservationists hope that somewhere wild populations of these two species persist. But search teams sent out to find the birds have come up empty. Until the 1800s, macaws



SCARLET MACAWS, ROBERT E. MUMFORD/NATURAL IMAGES PHOTOGRAPHY

inhabited West Indian islands, which might explain why images of Caribbean pirates include macaws on their shoulders. Such capture, along with hunting and habitat destruction, drove the Cuban macaw (*Ara tricolor*) to extinction. The last reliable sighting of this red-orange, yellow, and blue bird was in 1864.

According to the International Union for Conservation of Nature's Red List of Threatened Species, three of the surviving macaw species are critically endangered, four are endangered, one is near threatened, and one—the military macaw—is vulnerable. The remaining seven fall under the “least concern” category, meaning that although the species may be declining in some areas, ample habitat and healthy populations remain elsewhere.

Macaw Idiosyncrasies

Social and monogamous, macaw pairs nest in cavities, usually in trees, although some species and populations use cliffs. They are slow breeders and cannot easily bounce back when nest trees fall or their young are taken by tree-climbing poachers. To get an idea of the investment in time and energy it takes macaw parents to raise young, consider a comparison: American robins (*Turdus migratorius*) and many other songbirds incubate their eggs for about two weeks, then their young leave the nest

about two weeks after hatching. Macaws, on average, incubate twice as long, for an entire month. Then it takes up to 100 days (14-plus weeks) for surviving nestlings to reach independence. American robins often nest twice, sometimes three times, a season and often at least two young survive each nesting attempt. Only rarely does more than one macaw chick reach adulthood, and, in many cases, no nestlings survive, succumbing to parasites or predators such as hawks. And while many of the details of wild macaw breeding remain a mystery, there is evidence that some wild macaws don't breed every year—possibly due to lack of available nesting trees. This makes them even slower breeders than previously thought.

Macaws are on a constant quest for food. Pairs commute back and forth between traditional roosting and nesting sites and their feeding grounds. Raucous in flight, they usually keep silent while feeding in the treetops. They have a perfect tool kit for cracking open tough nuts, stripping bark, or manipulating small fruits: Large feet with two toes in front and two in back hold objects steady while the birds work their hooked bills, strong jaw muscles, and large, versatile tongues.

Macaws often eat unripe fruits and seeds, and may pick up toxic substances while feeding. Many ornithologists think this explains why the birds will eat lumps

of clay to help absorb or filter toxins in their systems. They make visits to clay licks—deposits of clay near rivers or in the forest—to ingest the clay each day. Until the birds' burrows were found a few years ago, the breeding cliffs near Sumaco Volcano were assumed by locals to be clay licks for the military macaws. The site may serve both purposes.

The Ones That Haven't Gotten Away

While, overall, macaws can be said to be in decline, some promising stories point to a hopeful future for the struggling species. In 1987, just 70 Lear's macaws (*Anodorhynchus leari*) remained in northeast Brazil. But over the past 22 years, Brazilian and international organizations have banded together to protect and expand a reserve for these birds. It includes roosting and nesting cliffs and palm groves where 751 individuals were counted in 2007—a ten-fold population increase. The only protected area for the species, the reserve now spans 3,600 acres.

Habitat choice of different species can also dictate how well macaws fare when living near humans. Gelis, who has surveyed parrots in Peru, says “Pretty much anywhere in Amazonia blue-and-yellow macaws (*Ara ararauna*) and red-bellied macaws (*Orthopsittaca manilata*) can do alright because they favor palm swamps, and these are usually not in people's land-use plans. The situation is different for red-and-green (*Ara chloropterus*) and scarlet macaws (*Ara macao*). They need canopy-height hardwood trees. People like those, too.”

Fortunately, macaws don't necessarily require untouched forest. Certain agriculture and forestry practices can go on, and if important food and nest trees are left standing and the birds are left unmolested, macaws can coexist with loggers and farmers. Until recently, foresters sought out *Dipteryx panamensis* trees in Costa Rica. These food and nest trees, which can reach 180 feet tall and be centuries old, are crucial to the survival of scarlet and great green macaws (*Ara ambigua*). When they were selectively cut, Costa Rican forests that appeared otherwise healthy were devoid of the macaws that depend upon them. Since late 2008, Costa Rican law has protected this tree from harvest.

Conservationists who pushed for the ban hope this action will help the country's macaw populations rebound.

Caged

People have a special bond with parrots, but they have a particular fondness for the largest and the flashiest. For this reason, macaws remain in high demand as pets. Many countries such as the United States and those in the European Union now ban import of wild-caught parrots. And many species, including macaws, are now bred in captivity. But parrot poaching remains a widespread problem in Latin America, where protection laws exist but are often ignored.

"The big problem across much of Latin America nowadays is heightened internal demand," says ornithologist Robert Ridgely, an authority on Central and South American birds and co-author of *The Birds of Ecuador*. "People love to have parrots as pets, and as human population levels rise, demand only increases. And there is little or no control over internal trafficking of wild birds in Ecuador or elsewhere."

"In Ecuador," Gelis tells me, "it's not as bad as I've seen in other countries such as Mexico. But if people want parrots, they just go out and get them." In my neighborhood in the suburbs of Quito, I hear macaws screeching far from their wild haunts. These pets almost certainly hail from the Amazonian forests of Ecuador or Peru. As the economy and population continue to grow here in Ecuador, roads and development projects are reaching areas not long ago considered remote. The road passing through the area where we watched for macaws is being fully paved for the first time. Trucks whizzed past us, honking from time to time. Easier travel means more settlements and more people. While parks protect a lot of habitat in the area, the military macaw breeding ground has no formal protection and there's been no great cry for it. "I'm mortified that nobody's talking about macaws in Ecuador," says Gelis, "specifically military and red-and-green macaws. I don't understand why there's not some great alarm going off." In coming years, these and the great green macaw might vanish from the country.

"The red-and-green macaw seems to have dropped out from almost everywhere



ROBERT E. MUMFORD/NATURAL IMAGES PHOTOGRAPHY

in eastern Ecuador, even in areas that are remote indeed," notes Ridgely. "I have not seen the species in Ecuador since the mid-1990s and even then a few pairs." Fortunately, the red-and-green macaw has a wide range. Although it has declined in Ecuador and other countries, it remains widespread and common in parts of Peru and Brazil.

What can be done to keep wild macaws from disappearing like their already lost relations? "Certain efforts to protect wild lands and habitats and the species themselves, bird tourism, along with some changes in local attitudes, may help to avoid extinction...at least that is the hope," says Paul Greenfield, illustrator and co-author of *The Birds of Ecuador*. "If birds and nature are not perceived by people as being important generators of well-being, or as

being considered as true resources that can raise living standards through sustainable management and use, there is little hope that things will change dramatically."

Two months before my military macaw trip, I stayed at Sani Lodge, an ecotourism venue near the Napo River in Ecuador's eastern lowlands. There, macaws are money-earners. By living wild as they always have, they help generate income for the local indigenous community, whose members staff the lodge. People visit from around the world precisely because the Amazonian forest, waterways, and wildlife communities there remain intact.

From a dugout canoe in the middle of an oxbow lake, my family and I marveled at the dusk flight of dozens of long-tailed birds headed off to their roosts. The macaws' raucous calls echoed across the lake's forest-choked edges. Scattered pairs of huge blue-and-yellow macaws were flanked by smaller, green-bodied chestnut-fronted macaws (*Ara severa*) and red-bellied macaws. Any parrot-lover, from pet store loiterer to world-traveling birder, would probably agree that to lose these wild macaws would be like losing the colors of the wilderness itself. ■

Currently based in Quito, Ecuador, HOWARD YOUTH is a long-time contributor to and former associate editor of ZooGoer.

Macaws at the Zoo

Want to commune with macaws in Washington, D.C.? Head to the Smithsonian's National Zoo, where you will find a pair of red-and-green macaws (also known as green-winged macaws) at the Bird House.



Living CLASSROOM

BY CINDY HAN

PHOTOS BY SMITHSONIAN-MASON STUDENTS

Smashing freeze-dried poop with a rubber mallet makes for an interesting day in the life of a college student. And this is no ordinary poop—it's the feces of Eld's deer, an endangered species that lives at the Zoo's Conservation and Research Center (CRC) in Front Royal, Virginia.

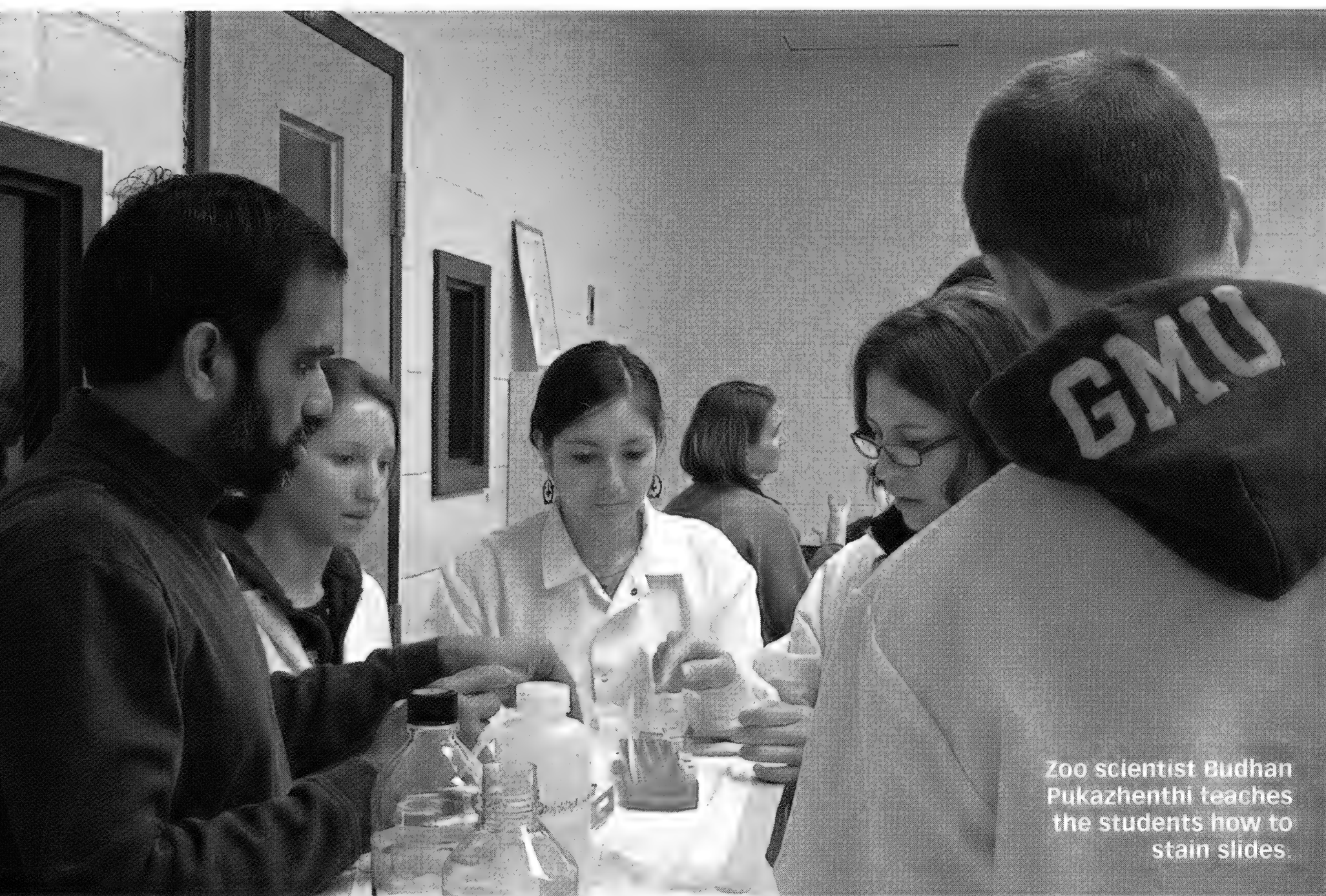
Fifteen young women and men, sporting lab coats over jeans, are in a laboratory at CRC's vet hospital, pulverizing the Eld's deer poop into powder. Fortunately for the students, the feces of herbivores doesn't smell too bad. The students will later use the powder to create liquid samples they will analyze for hormone levels. As the students have learned, studying an animal's feces can yield a great deal of information—including whether or not the animal is pregnant.

A day in the lab is just one of many hands-on learning opportunities for this cohort of students enrolled in the Smithsonian-Mason Semester, one of the Smithsonian-Mason Global Conservation Education Studies programs. The students spend a semester living in dorm rooms at the Zoo's sprawling campus in the Shenandoah Valley. In less than four months, they take 16 credits worth of classes taught by prominent scientists and educators from the Zoo, as well as George Mason University (Mason) and other institutions. It's all part of a partnership between the National Zoo and Mason, officially kicked off in October 2008, to offer an academic "living and learning" community based at the Zoo's 3,200-acre grounds in Virginia.

College students live and learn at the Virginia campus of the Smithsonian's National Zoo as part of a unique partnership with George Mason University.



ALFONSO ALONSO/NZP



LAUREN REITER

Zoo scientist Budhan Pukazhenth teaches the students how to stain slides.



PEYTON MORRIS

RICKY HUTCHINSON didn't know what to expect when he arrived at CRC. A junior at Mason, he was initially a French major who studied for a semester in France. But he was losing interest in his major, happened to hear about the Smithsonian-Mason program, and was intrigued enough to give it a try. After a few weeks, he decided to switch his major to conservation biology. "The classes have really sparked my interest. Every day I learn some new fact about wildlife," he says. "I love animals, and I like the idea of doing something that I can feel passionate about that won't keep me in an office."

Making a Model

"What we're doing here is unique," says Tom Wood, who, as director of the Mason Center for Conservation Studies, helped start the Smithsonian-Mason program. "There are so many positives coming out of this. We're integrating the incredible resources of the Zoo and the university. We're providing an interdisciplinary learning environment that can serve a wide array of students. And we're creating a community of students and faculty who are passionate about conservation."

The Smithsonian-Mason program is now in its second year housing college students on the CRC campus for a semester, but it really started years ago. The program's origins can be traced to a friendship that formed between Wood and the Zoo's acting director, Steve Monfort, back when both were starting their Ph.D. research at CRC in the late 1980s. Over the years, the scientists talked about ways to improve science-related education—particularly in conservation biology. After Wood began teaching at Mason and Monfort took on a leadership role at the Zoo, a natural link began to surface. The two exchanged ideas about how their institutions could join forces to address the gaps in conservation education.

"By the mid-1990s, Tom and I realized that given the environmental threats to our planet, there could be no greater goal than to invest in educating and training the next generation of conservation professionals. We felt a sense of urgency to act and so we began looking for ways to expand the partnership between the Zoo and Mason," says Monfort. Over the next several years, they laid the groundwork for faculty and students alike to take courses in conservation at CRC. Their dream was to help create a national model for a learning community where conservation could be taught in an interdisciplinary, interactive way. The result is the Smithsonian-Mason Semester.

A Good Combination

The partnership has blossomed into a full-fledged program that provides a rigorous academic semester to the 15 students in this year's cohort. The students come from diverse backgrounds. Many are Mason conservation biology students in their junior year—the optimal time to use the program as a springboard to internships and other experiences before completing their undergraduate education. Some are younger or older, looking for inspiration as to what field to pursue or seeking contacts for a future career. Some come from very

different fields, from women's studies to French. The program is also open to students beyond Mason; this year, a few students from other universities heard about the program and were invited to join.

"I came here because it's the only program of its kind," says Lauren Reiter, a zoology major from the University of Miami in Ohio. "It's been a great opportunity to meet scientists from all these different fields and to hear how they got their start." Echoing this sentiment, several of Reiter's fellow students cite networking as the number one benefit of the program.

As for the faculty who currently help teach the various Smithsonian-Mason classes, they not only impart knowledge, but gain valuable experience themselves. The instructors are a diverse group, including veterinarians, geneticists, mathematicians, economists, and photographers.

"They are doing this because they believe in it," says Miles Roberts, a wildlife biologist and curator of the Zoo's Amazonia Science Gallery, who guides the students on their semester-long research projects. He says he and other instructors keep some basic questions in mind as they teach the students: "What can we do to help them? What would we have benefited from when we were starting out? How can we open doors for them?"



PEYTON MORRIS



DIANE WYSE



KYLIE ZIRBEL

JIMMY MUNSE was one of the guinea pigs in the first class to go through the Smithsonian-Mason program last year, and he calls it a “once-in-a-lifetime opportunity.” When program leaders asked him to return, this time as a resident advisor, he was happy to accept. He had just completed a professional internship at Disney’s Animal Kingdom in Florida, where he served as an educational presenter, handling animals like frogs and snakes. “After going through the Smithsonian-Mason program, my knowledge was way above the other educators,” he says. “And not only about keepers and vets and wildlife—I learned how to communicate about conservation biology.”

PEYTON MORRIS can often be found snapping photos of her fellow students in action. A communications major from Austin College, Texas, she hopes to apply her skills to documenting conservation subjects through film and other media.

Ironically, she wasn’t able to photograph her own favorite moment of the program thus far. During the students’ introductory tour of the National Zoo’s Bird House, a keeper brought out a North Island brown kiwi—Peyton’s favorite animal. Somehow, the bird walked straight over to Peyton and nestled itself between her ankles. She crouched protectively over it, eyes wide with delight. “That was an amazing experience,” she says.

KENDRA SMYTH always wanted to work with endangered species. A Mason senior, her concentration is in veterinary studies, and she’s already done two internships with the National Zoo. “After my experience this semester, I’ve found I’m most interested in research, particularly related to endocrinology and reproductive biology.” Thanks to the program, she’s switching her vet school plans in order to pursue a Ph.D. in environmental science or biology.

To train the future generation of conservation biologists, he knows the trick is to “get those light bulbs to go on,” to ignite the students to act on their interests in helping the environment through whatever field of study they pursue. That’s why he and the other instructors focus on more than just lecturing about science; they touch upon topics such as how to get a job, how to talk to people, and how to work on policy issues.

“Of course they need to learn about ecology, reproductive biology, and all of that,” says Roberts. “But so much of this involves other areas: economics, culture, conflict issues. If you’re going to be a conservationist, you have to be versed in all of those other things. Maybe you want to save tigers, but maybe you’ll never even see a tiger—instead, you might work with a community or an organization to help tigers.”

This Is School?

One sure sign that the Smithsonian-Mason students are not in an ordinary academic setting comes every day around 2 a.m.—it’s the sound of barking. “The first time I heard it, I halfway woke up and thought, ‘Whose dog is that?’” recalls Virginia Griffith, a Mason junior studying conservation education. “Then I realized it was coming from

The animals that inhabit the grounds of CRC serve as a daily reminder of why the students should care about conservation.

the maned wolves. They were barking not far away from my room. How cool is that?”

The maned wolves are just some of the resident animals at CRC that students are able to see and learn about throughout the semester. The students walk by red pandas on their way to and from class, and clouded leopards and rare birds such as Micronesian kingfishers are housed nearby. Some students help Zoo staff take care of cranes, Eld’s deer, and other animals.

But students who enter the program must be aware that they’re not simply coming to interact with animals. Instead, the wildlife that inhabit the grounds of CRC serve as a daily reminder of why we should care about conservation—for

the protection of these creatures and our natural world.

A typical day in the life of an SI-Mason student may include classes, off-site trips, or hands-on lab or field work. One day may be spent in the classroom learning about conflicts between humans and wildlife; another may be a session in conflict resolution. From biodiversity to ecotourism, the topics covered demonstrate the wide reach of conservation studies.

“The learning here is integrated across all disciplines,” explains Jennifer Buff, academic program manager for the Zoo’s Center for Conservation Education and Sustainability (CCES). “Normally, a college student might go to a class, leave, then go to another completely separate class—and there’s often a disconnect. This program has different courses all woven together into a real picture of conservation biology.”

Some days are made up of hands-on learning. As part of their semester, the students took trips to the National Zoo in Washington, D.C.; learned about nature photography and tested their skills at local protected areas such as Shenandoah River State Park; and tried their hands at wildlife monitoring using Geographic Information Systems (GIS) equipment. In the laboratory, they had that fun day of poop-smashing,

Bigger, Better, **GREENER**

The Conservation and Research Center will get a green facelift as part of a larger plan to expand upon the current Smithsonian-Mason program. The current 15-student undergraduate program is just the beginning of something bigger. The Smithsonian's National Zoo is working closely with George Mason University to establish an academic partnership that offers an even wider scope of courses in conservation biology.

"We will be taking it to the next level," says CCES academic program manager Jennifer Buff. The Zoo will join academic partners to develop and test a whole suite of programs for undergraduates, graduate students, professors, staff, and even international scientists and students.

To accommodate this vision, the CRC campus—which currently offers just enough space and housing for a limited number of students—will be expanded consistent with CRC's master plan. The new buildings will model the best green practices, including green-roof technology, geothermal heating and cooling, composting kitchen waste, reuse of rainwater, and stormwater management.

The goal is to be able to house 60 undergraduate students along with 60 grad students and professionals in the new facilities. These sustainable buildings will include dorms, a recreation center and cafeteria, classrooms, and offices. "We hope to create a brand-new learning community by 2012," says Buff. "Students and instructors will be immersed in a world that's actively making a difference."

but also learned basic lab skills such as how to use a micropipette, how to perform an assay, and how to interpret hormone data. The next week in the lab was spent learning about freezing animal semen for use in artificial insemination—an area of exper-

Smithsonian-Mason student Kristen Donahue and photographer Bob Tope discuss nature photography, one of the topics covered during the semester.

tise that the Zoo's scientists are uniquely qualified to teach.

Throughout the Smithsonian-Mason semester, the students also work on group case studies. A major element of the program, the case study calls for each student to do extensive research culminating in a written paper and oral presentation at the end of the semester. The project pulls together what the students learn, from writing skills to understanding human-wildlife dynamics. One group chose to

look at the relations between humans and Asian elephants in India, while another is analyzing ecotourism in Nicaragua.

From start to finish, the program encourages students to enhance their knowledge and to build upon their idealism and desire to make a difference. It also offers practical benefits. Meeting so many people from diverse fields gives the students an abundance of opportunities to network and pave the way to further studies or careers in conservation.

Life in Close Quarters

Beyond the academic side, being a part of the Smithsonian-Mason program offers its unique brand of extracurricular activity as well. Students are generally finished with the day's classes or activities by late afternoon, so what do they do after that? "Homework," is the most common reply. The grounds of CRC, a former military depot located within a rural community, offer little in the way of entertainment.

A ping-pong table in the dining hall gets regular use. "We all play," says Virginia Griffith. "It's great for letting your energy out." There are occasional movie nights, and some students have brought in videogame systems to share. No one seems to mind the close quarters. The ratio of 12 females to three males is a non-issue, they say—even with only one bathroom per gender. The young women have miraculously figured out shower schedules, and the guys don't have to worry about competing for bathroom time.

Despite the little free time the students have during their immersion in conservation education, many of them fill the remaining hours volunteering around CRC. To take advantage of living on the Zoo's campus, many of them help the animal keepers, such as watching monitors into the wee hours for the birth of clouded leopard cubs. With all the research at CRC, the Zoo's lab technicians are particularly busy, and some of the students choose to get extra lab experience by volunteering. In fact, when the lab techs put out a call for people to help on the weekends, they got seven student volunteers. Their primary duty? Going at it with those rubber mallets, smashing up a variety of animal poop. ▀


— CINDY HAN *is the editor of Smithsonian Zoogoer.*



LAUREN REITER

WITH
JENNIFER ZOO

Who's looking at you?

See if you can tell which Zoo creature is in this photo, then visit <http://nationalzoo.si.edu/goto/whereinthezoo> to find the answer and learn more. 



MEGHAN MURPHY/NZP

DID YOU KNOW? Which local animal makes itself right at home at the Zoo?

The black-crowned night heron (*Nycticorax nycticorax*) is native to the Washington, D.C., area, and nearly 400 of them return to the Smithsonian's National Zoo every April. Although you might see them around the Bird House, these distinctive birds have not actually been part of the Zoo's collection since the 1990s.

The night herons' spring arrival is an exciting time for keepers and visitors, but not necessarily for birds who call the Zoo home year round. Just ask the kori bustard, whose meals are often literally snatched from its beak by the stocky, red-eyed heron. The night herons fly up from the south to breed

and gorge themselves on fish and mice, so keepers add up to 50 percent more food in many of the outdoor enclosures while the herons are on Zoo grounds. Luckily for the koris, black-crowned night herons only visit until August. But these guests are not just picky about food. To build their nests, they use only twigs they have selected and snapped off trees. Zoo researchers count these nests after the birds migrate south for the winter to estimate populations and learn more about their habits. Keepers have also banded one of the male night herons to keep track of him—he's been coming back for more than 12 years now.



JESSIE COHEN/NZP

ANIMALIA
JENNIFER ZOO

DAVID TIPLING/NATUREPL.COM



SUPERLATIVE Loudest animal at the Zoo

Listen carefully as you walk through the Zoo and you might hear the roaring of a lion, tiger—or black howler monkey (*Alouatta caraya*). Thick necks and massive vocal chords enable male howler monkeys to penetrate three miles of dense forest with a single rumbling growl. It's a fair warning to hungry members of neighboring troops that nutritious leaves, fruits, or flowers have already been claimed. These booming territorial calls have earned the primates, which are native to Latin America, the title of loudest animal in the New World (North, Central, and South America).

With plenty of food and space to roam at the Small Mammal House, Reubin and Jolla, the Zoo's resident howler monkeys, have little need to call out to competitors. However, keepers occasionally play recordings of howler vocalizations from a distance, prompting the pair to show visitors exactly how they earned their name.

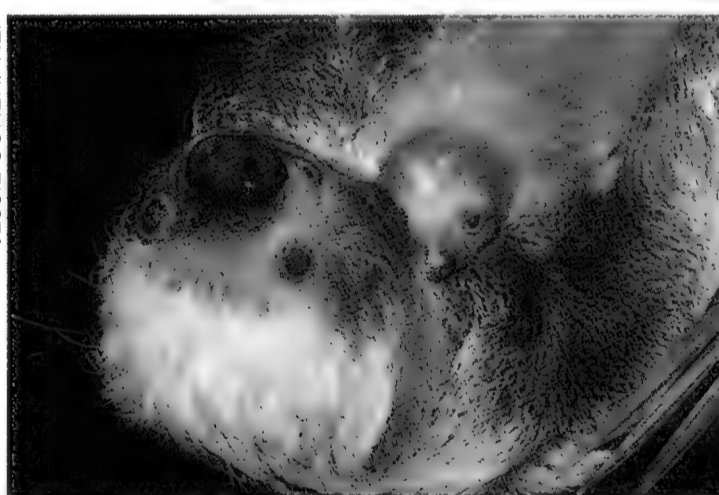
FACT OR FICTION? Sloths are lazy

In defense of sloths, their lack of movement is more wise than lazy. After all, what's the best defense against predators lurking around the 80-foot canopies of Central and South American forests? Make like a Linné's two-toed sloth (*Choloepus didactylus*) and do nothing.

Any slight disturbance in the trees could attract a predator, so sloths have adapted an effective way to hide: stay still and hold their dung, called middens, for nearly a week. Digested leaves, twigs, and fruits can add up to nearly 30 percent of a sloth's body weight. With full stomach and added pounds, the sloth musters enough energy to climb down the tree, albeit at a leisurely, one-third-mile-per-hour pace, to deposit its middens on the forest floor. That's why when it comes to bathroom rituals, sloths are actually among the least lazy in the animal kingdom.

If you're sleuthing for sloths at the Small Mammal House or Amazonia's rainforest exhibit, keep your eyes peeled for a brownish-gray furry coat with hints of green algae. It's perfect camouflage from predators—and Zoo visitors!

JESSIE COHEN/NZP



Mantis shrimp have an upper body that looks like a praying mantis and a tail that looks like a shrimp. However, this cool crustacean is not actually related to either—it's classified in its own order, Stomatopoda.

There are about 400 types of mantis shrimp. They range from shades of brown to bright, neon colors, and some types can grow up to 12 inches. They live in shallow sea waters and can even be found in the Chesapeake Bay. One thing all mantis shrimp have in common—they have some amazing powers!

BY PAMELA
BUCKLINGER



The Mighty MANTIS

FAST FACTS

- Some mantis shrimp are monogamous, or have the same partner, for up to 20 years.
- When swimming, most mantises kick their tails through the water like lobsters, but one species flips like a wheel when it wants to roll into a nearby tide pool.
- Mantis shrimp make a distinctive clicking sound by pounding rocks with their claws.
- The snap of the mantis' claws is so fast it can produce light (though we can't see it without scientific equipment).
- The mantis shrimp's tail can curl up to shield it from the blows of other mantis shrimp.

» Next time you visit the National Zoo's Invertebrate Exhibit, see if you can find our brightly colored peacock mantis shrimp (*Odontodactylus scyllarus*). Watch its eyes move in all sorts of interesting ways!

Packing a Punch » In relation to their size, mantis shrimp are the most dangerous animals alive. They have powerful claws tucked secretly under their heads, which they use to attack their prey. Most mantises don't wait around for food to come to them. Instead they stalk, chase, and punch. A mantis shrimp's punch is one of the quickest animal movements on the planet. How fast? Faster than a speeding bullet! It's strong enough to break through some aquarium glass. It's Supershrimp!

A Smash Hit » Mantis shrimp are divided into two camps by their claws. Some are "smashers" and others are "spearers." Smashers have club-like claws that they use to hit their meal until it is stunned and can't move. Not even their prey's hard shell gets in the way when the mantis shrimp dines on snails, crabs, oysters, and other mollusks. Spearers have up to 20 spines on the ends of their claws that they use to spear their prey. They eat softer animals like fish and shrimp. Both kinds of mantis shrimp take on animals much bigger in size.

Triple Eye Spy » Mantis shrimp also have super-power vision. While humans have binocular vision and see using two pupils (one in each eye), mantises have triocular vision, which is like having three pupils in each eye. This gives them the ability to see up to 100,000 colors—ten times more than humans—and they can see ultraviolet and infrared light. Also, their eyes are located on super-flexible stalks and can move independently of each other. This helps them see in every direction. Scientists think that mantis shrimp have the most complex eyes in the animal kingdom.



When Sparks Fly

The mantis shrimp's claws move so quickly they can produce light. Well, guess what—you can create sparks, too!

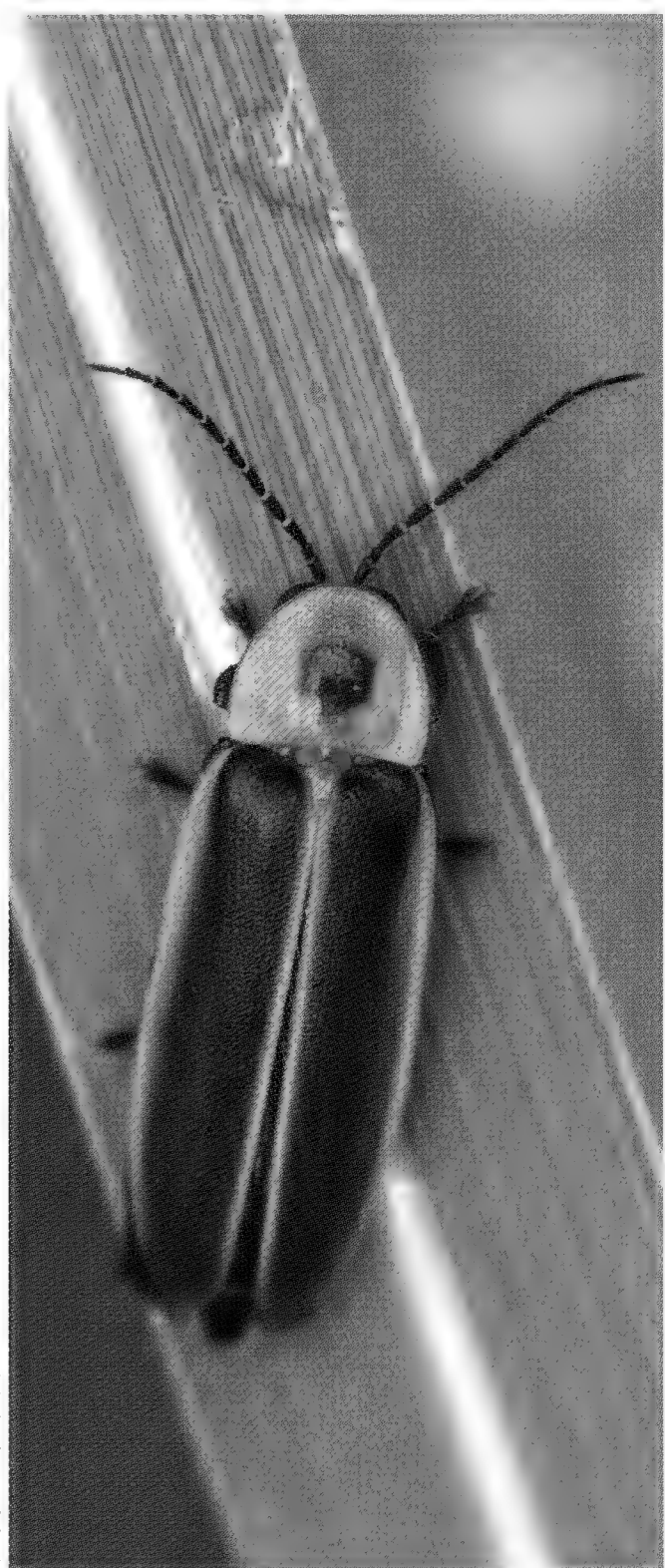
Get a partner, turn off the lights, bite down on a wintergreen-flavored, sugar-based hard candy (such as LifeSavers), and watch the sparks fly! Technically, they aren't sparks—they're energy being released from crunching the candy. When crushed, all hard, sugar-based candies release a tiny electric charge that might appear as a faint glow, but wintergreen candies flash the brightest. The oil of wintergreen that gives the candy its flavor has fluorescent properties, which makes the electric charge show up as blue sparks in your mouth!

Make Googly Eyes

Look like a mantis shrimp! All you need is a headband, two foam balls, pipe cleaners, glue, and wiggly eyes.

- Glue wiggly eyes onto balls.
- Secure one end of a pipe cleaner by wrapping it around the top of the headband, leaving a few inches sticking up. Repeat with the other pipe cleaner, so that the "eye stalks" are centered on the headband, about two inches apart.
- Poke the balls onto the free ends of the pipe cleaners.
- Decorate and have fun ... but remember to leave the smashing and spearing to the mantis shrimp!

BY MARY-
RUSSELL
ROBERSON



ISTOCKPHOTO.COM

{ CONSERVATION STATION }

Lighting the Way

Love to spot fireflies on a summer evening? Now you can do it while also contributing to scientific research. Christopher Cratsley, associate professor of biology at Fitchburg State College, needs your help. “We want to document whether we are losing populations of fireflies,” he says. “It’s been anecdotally reported, but we want to try to attach something more quantitative to it. And we want to draw on the general public to help.”

Last year, in collaboration with the Boston Museum of Science, Cratsley and other scientists started Firefly Watch, a citizen-science program designed to gather information about fireflies in the United States. More than a thousand volunteers participated; this summer the researchers are hoping for even more.

Volunteers pick at least one site that they can visit once a week during firefly season, which begins in late May or early June. They record information about the habitat and the numbers and types of fireflies at the site. “It’s difficult for an untrained observer to identify fireflies,” Cratsley says, “But you can get an estimate of species diversity by noting the number of colors and patterns of flashes.”

Cratsley says he and the other researchers are particularly interested in learning where fireflies are *not* being found, because it will help the researchers figure out what fireflies need to survive.

Cratsley suspects that both firefly larvae and their prey (soft-bodied invertebrates such as earthworms) need moist soil. And fireflies are likely to be sensitive to light pollution because it interferes with the nocturnal signals they use to attract mates.

■ If you’d like to help, go to <https://www.mos.org/fireflywatch/>

[RESEARCH REPORT]

The Telltale Tiger

Using DNA sequencing techniques, a team of scientists reported in February that they have sequenced part of the genome of the extinct Tasmanian tiger. The source of the DNA? Hair from museum specimens. One of the specimens was a pelt from a Tasmanian tiger that died at the Smithsonian’s National Zoo in 1905. The fact that museum specimens are now a viable source for DNA analysis opens a treasure trove of possibilities for research.

Tasmanian tigers, also called thylacines, were carnivorous marsupials that originally lived in Australia, Tasmania, and New Guinea. Although they resembled dogs, they were more closely related to kangaroos. By the time Europeans settled Australia, thylacines lived only on the island of Tasmania. Because they ate sheep, the government paid ranchers to kill them beginning in 1888. In the early 1900s, a fatal distemper-like disease spread among thylacines in the wild and in zoos. The last-known wild Tasmanian tiger was killed in 1930, and the last captive one died in 1936.

In 1902, a wild-caught female thylacine arrived at the National Zoo with three babies in her pouch. One of the babies died nine days later, but the other two—a male and a female—survived to maturity. The male died in 1905; in 2008, hairs from his pelt were used for the DNA analysis.



NZP ARCHIVES/SMITHSONIAN'S NATIONAL ZOO

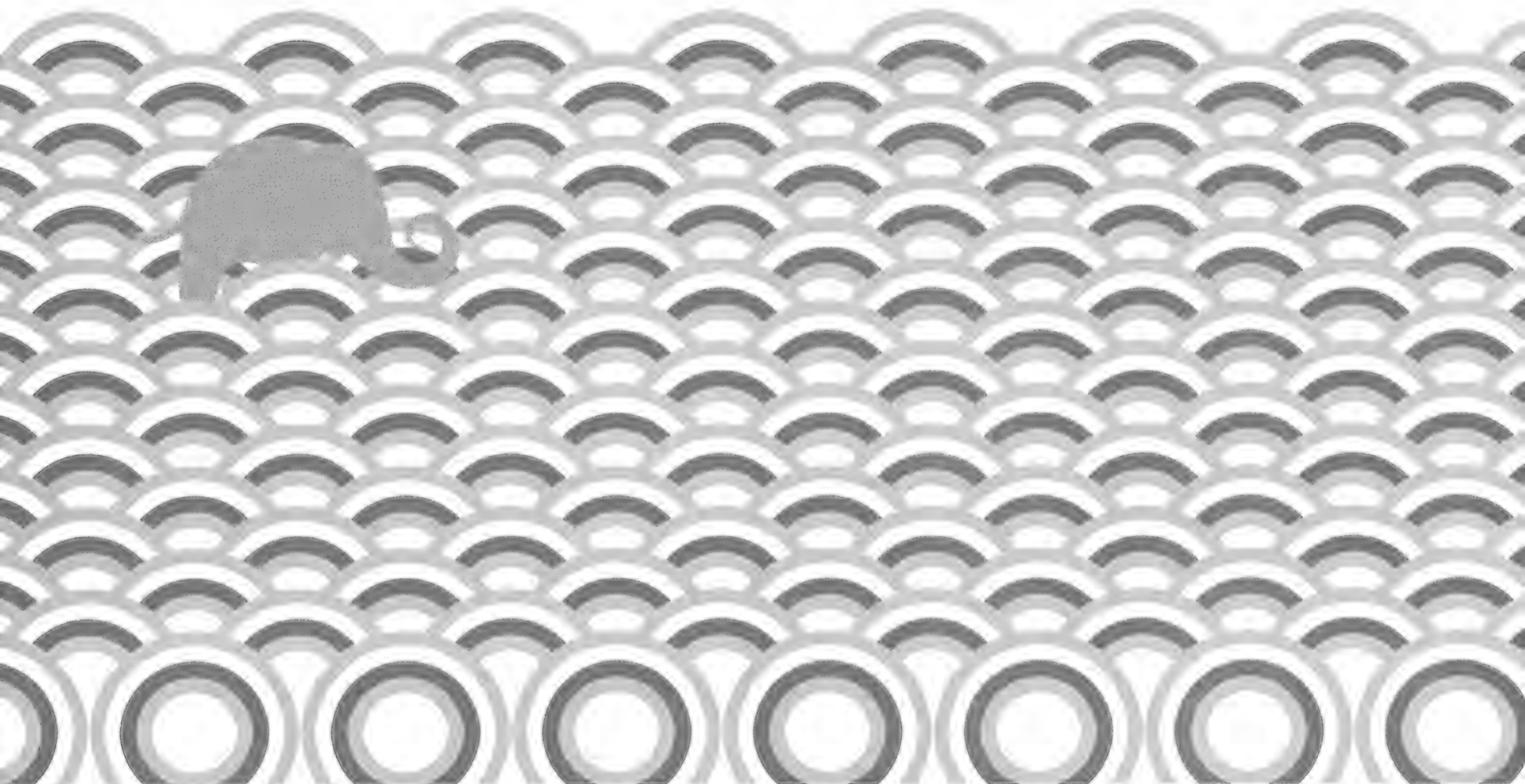
Kristofer Helgen, curator of mammals at the Smithsonian’s Museum of Natural History, was part of the team that analyzed the DNA.

It’s possible the disease-causing microbe still exists on the hair of the museum specimens and could be identified through DNA analysis. Learning more about how fast-spreading diseases wipe out populations could help scientists devise ways to save more species.

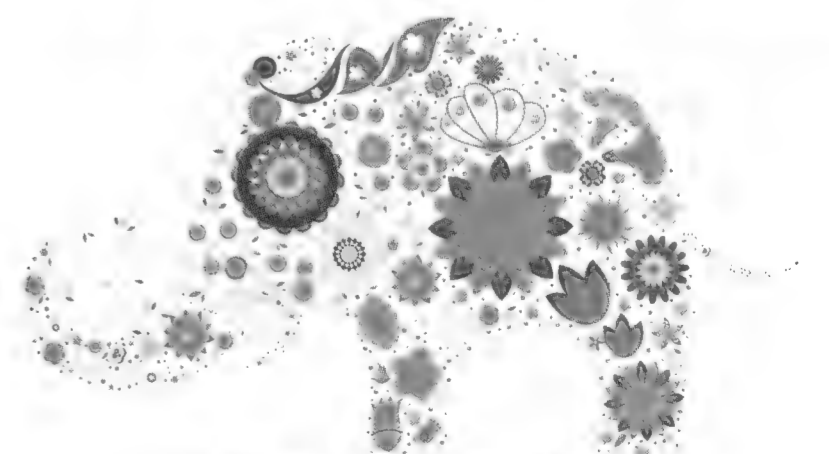
■ For more info, visit <http://thylacine.psu.edu/>



100 gourmet restaurants, 15 fine vintners,
and a giant helping of conservation.




Join us Thursday, May 14, for ZooFari 2009 as we celebrate elephantine appetites and our commitment to Asian elephants. This enchanted evening will bring together an oasis of culinary delights, fabulous wine, live entertainment, and a spectacular auction. Get tickets today at www.fonz.org/zoofari.htm. Bid on auction items now at www.fonz.cmarket.com. Don't miss ZooFari 2009, where you'll find all the ingredients for an unforgettable evening.



ZOOFARI
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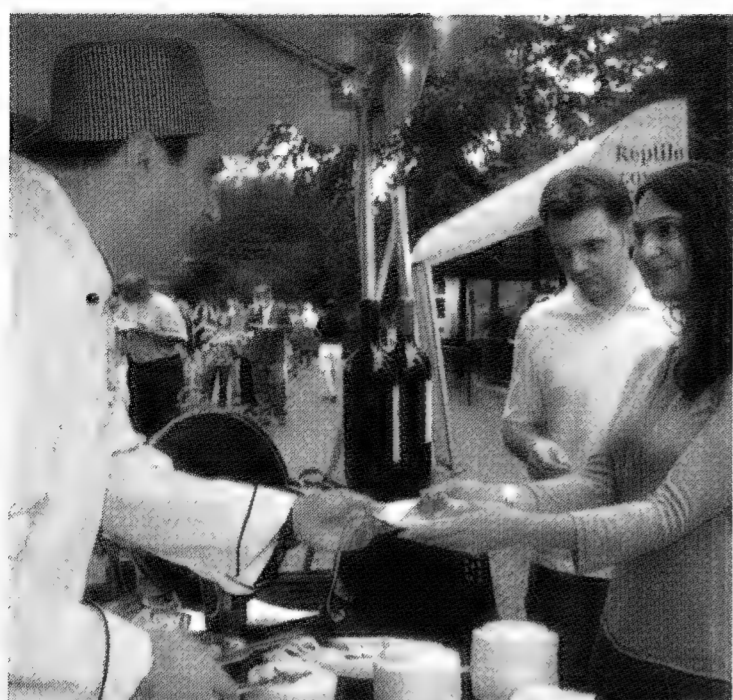
run. climb. discover. giggle. play.
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experience. imagine. grin. squeal.
enjoy. frolic. dance. invite. sing.
sense. amuse. live. **GuppyGala**
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Friday, June 12, 2009
6-8:30 p.m. at the National Zoo

FONZ members: \$15; nonmembers: \$25
Children under 2 are free. Rain or shine.

Tickets on sale now at
www.fonz.org/guppy.htm.



MEGHAN MURPHY/NZP

UPCOMING EVENTS

« ZooFari

May 14, 6:30 to 10 p.m.

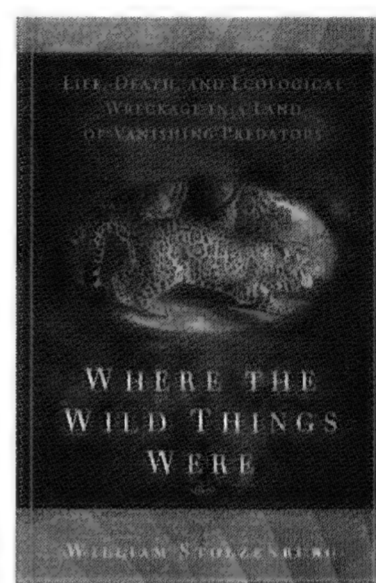
A fabulous way to spend an evening at the Zoo, ZooFari offers food from about 100 of the area's top restaurants and wineries, entertainment, and our popular silent auction. This year's theme

is "Elephant Affair." It's great fun for a great cause: Proceeds support the Zoo's fine work in Asian elephant care and conservation. For tickets and more information, visit www.fonz.org/zoofari.htm.

Lecture »

May 28, 6:30 to 9 p.m.

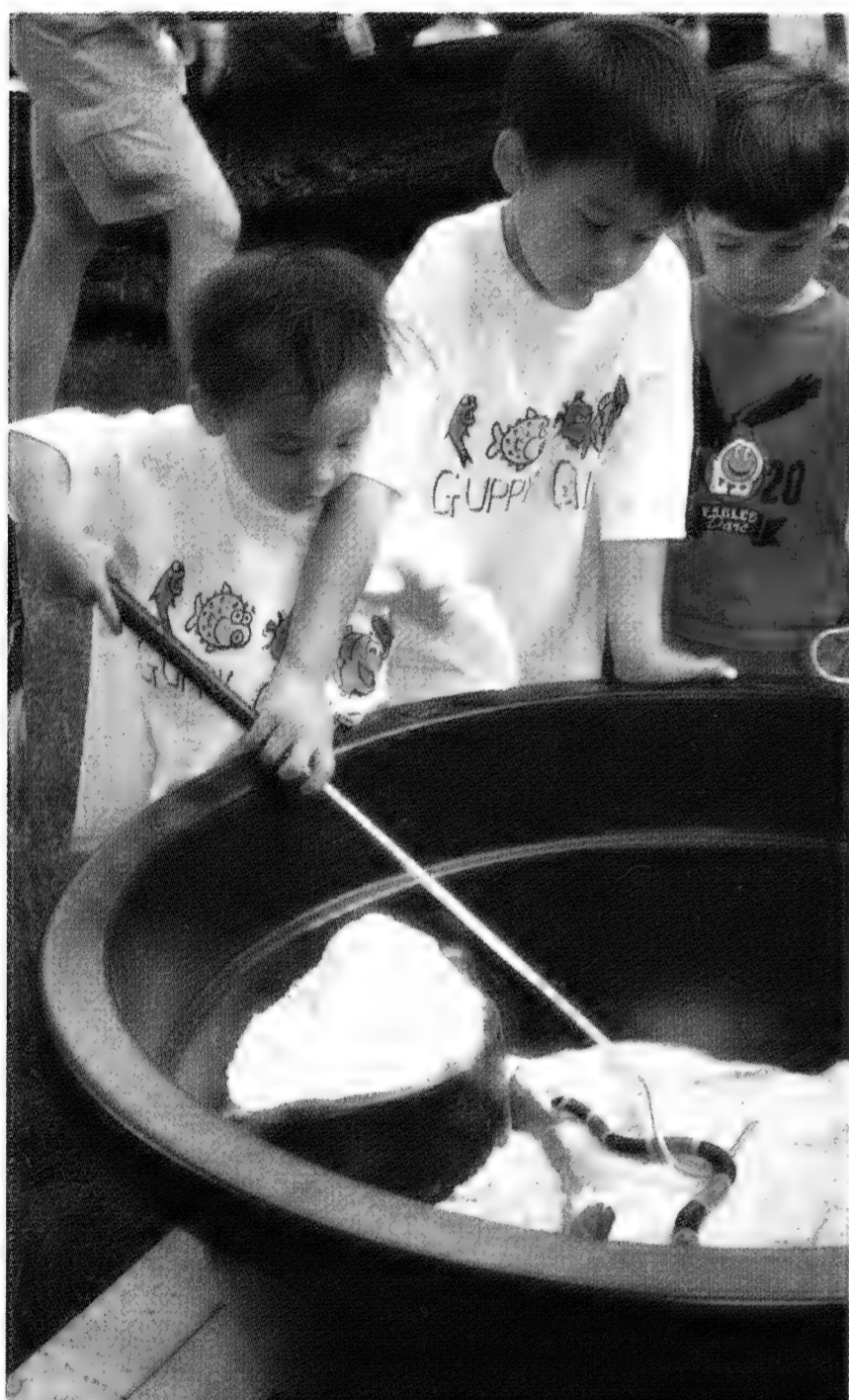
Wildlife journalist Will Stolzenburg presents fascinating insights from his book, *Where the Wild Things Were: Life, Death, and Ecological Wreckage in a Land of Vanishing Predators*. Learn about what happens when the great predators no longer rule the Earth. Come early for happy hour at 6:30 p.m., followed by the lecture at 7:30 p.m. Parking is free. For information, visit www.fonz.org/lectures.htm.



« Guppy Gala

June 12, 6 to 8:30 p.m.

The kids will have a blast at Guppy Gala, our annual evening event for children ages two to 12. Live performances and family activities are sure to entertain the kids, from jugglers and dancers to rock-climbing and arcade games. For tickets and information, visit www.fonz.org/guppy.htm.



MEGHAN MURPHY/NZP

Check this FONZ section in each issue of *Smithsonian Zoogoer* for important member news about Zoo events, classes, camps, and more. For more information, visit www.fonz.org.

FONZ Resources

Membership information
202.633.2922

FONZ special events
202.633.4470

Development office
202.633.3033

Camps and classes
202.633.4470

Volunteer service
202.633.3025

Comments? Questions?
Please email us at
member@fonz.org

Not a FONZ member yet?
Call 202.633.3034
or go to
www.fonz.org/join.htm

EVENT WRAP-UP

COCKADOODLE ZOO

FONZ members were treated to a morning full of activities on March 14. Thank you to Krispy Kreme for providing donuts to the happy guests.

EASTER MONDAY: Celebrating the African American Family

This springtime tradition, held on April 13, was rich with culture and Easter fun. Thank you to our sponsors: Botswana Tourism Board, United Airlines, and Howard University Radio WHUR 96.3 FM.

GRAPES WITH THE APES We appreciate the sponsors who supported this evening of wine-tasting on April 16: 94.7 Fresh FM and Capital Party Rentals.

EARTH DAY CELEBRATION The community came together on April 18 to help pick up litter and learn about ways to keep our ecosystem healthy.

BIRD FEST 2009

In celebration of International Migratory Bird Day at the Zoo, this May 2-3 event featured a lecture and weekend family festival. Thank you to these sponsors: DoD Partners in Flight, DoD Legacy Resource Management Program, and the U.S. Fish and Wildlife Service.

FONZ CLASSES

ADULT/CHILD CLASSES

» These programs are designed to allow adults and children to discover the Zoo together. All children must be accompanied by an adult. For the safety and enjoyment of everyone, unregistered children and siblings may not attend—with the exception of infants who are not yet crawling.

Children's classes and programs are open to FONZ members at the Household level and higher categories only. All classes meet in the Visitor Center unless otherwise noted.

Register online at:
www.fonz.org/classes.htm.

HEAR and Now!

FONZ is pleased to bring the Humane Education Ambassador Reader (HEAR) program reading initiative to the Zoo. HEAR is a community-based literacy program designed to help children develop compassion and empathy while building their listening and critical thinking skills.

Come join us as we read and discuss *So, What's It Like to be a Cat?* Learn the similarities and differences between house cats, great cats, and people.

AGES 3-8 (with an adult)

DATE May 7

TIME 12:30-1:15 p.m.

FEE Free (registration is encouraged but not required)



JESSIE COHEN/NZP



MEGHAN MURPHY/NZP

Talk Like the Animals

Whistle, grunt, roar, and sing to find out how animals communicate with each other. Come meet the Zoo's noisiest residents and make some noise of your own.

AGES 2-3 (with an adult)

DATES Session 1: May 16

Session 2: May 17

TIME 9-10:30 a.m.

FEE \$25

Walk Like the Animals

Furry, flat, wide, or webbed? Feet aren't just for walking. Come explore the wacky world of feet and take a walk on the wild side around the Zoo.

AGES 2-3 (with an adult)

DATES Session 1: May 30

Session 2: May 31

TIME 9-10:30 a.m.

FEE \$25

NEW Zoo Tales

Zoo Tales features readings of favorite children's books, animal activities, and simple crafts to take home.

A House for Hermit Crab

Come join us as we read the story *A House for Hermit Crab*, make your own hermit home, and get up close and personal with hermit crabs at the Zoo!

AGES Up to 24 months (with an adult)

DATE June 4

TIME 10-11:30 a.m.

FEE \$25



JESSIE COHEN/NZP

FONZ CLASSES



JESSIE COHEN/NZP

CHILDREN'S WEEKEND WORKSHOPS »

Children's workshops are for kids ages four to 14. Specific ages are indicated in each class listing. Parents are not encouraged to stay with the class, but may if they wish. There is no charge for an adult who attends with a child.

The Incredible Journey

You don't need your passport to set your mind in motion in this class that explores animal travels. Celebrate International Migratory Bird Day and learn about birds that can travel up to 40,000 miles a year. Then, dive into fun while learning about turtles and whales. Get a move on! Sign up today!

AGES 6-9
DATE May 9
TIME 9-11 a.m.
FEE \$28

A Day in the Life of Tai Shan

Get to know our youngest giant panda, Tai Shan, beyond his cute and cuddly exterior. Find out all about his daily activities and discover how much panda cubs and kids have in common!

AGES 4-5
DATES Session 1: May 16
Session 2: May 17
TIME 9-11 a.m.
FEE \$28

Cheetah Challenge

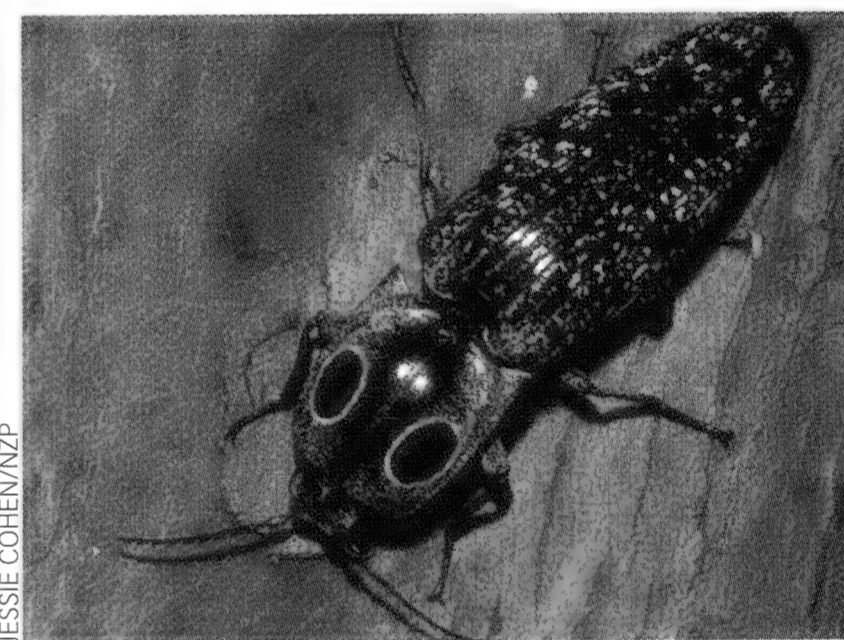
Did you know that a cheetah can reach a speed of 45 miles per hour in less than three seconds? In this high-energy class, challenge yourself and see how humans compare to the world's fastest land animal. You'll also find out what scientists are doing to help this endangered cat in its race for survival.

AGES 6-9
DATE May 30
TIME 9-11 a.m.
FEE \$28

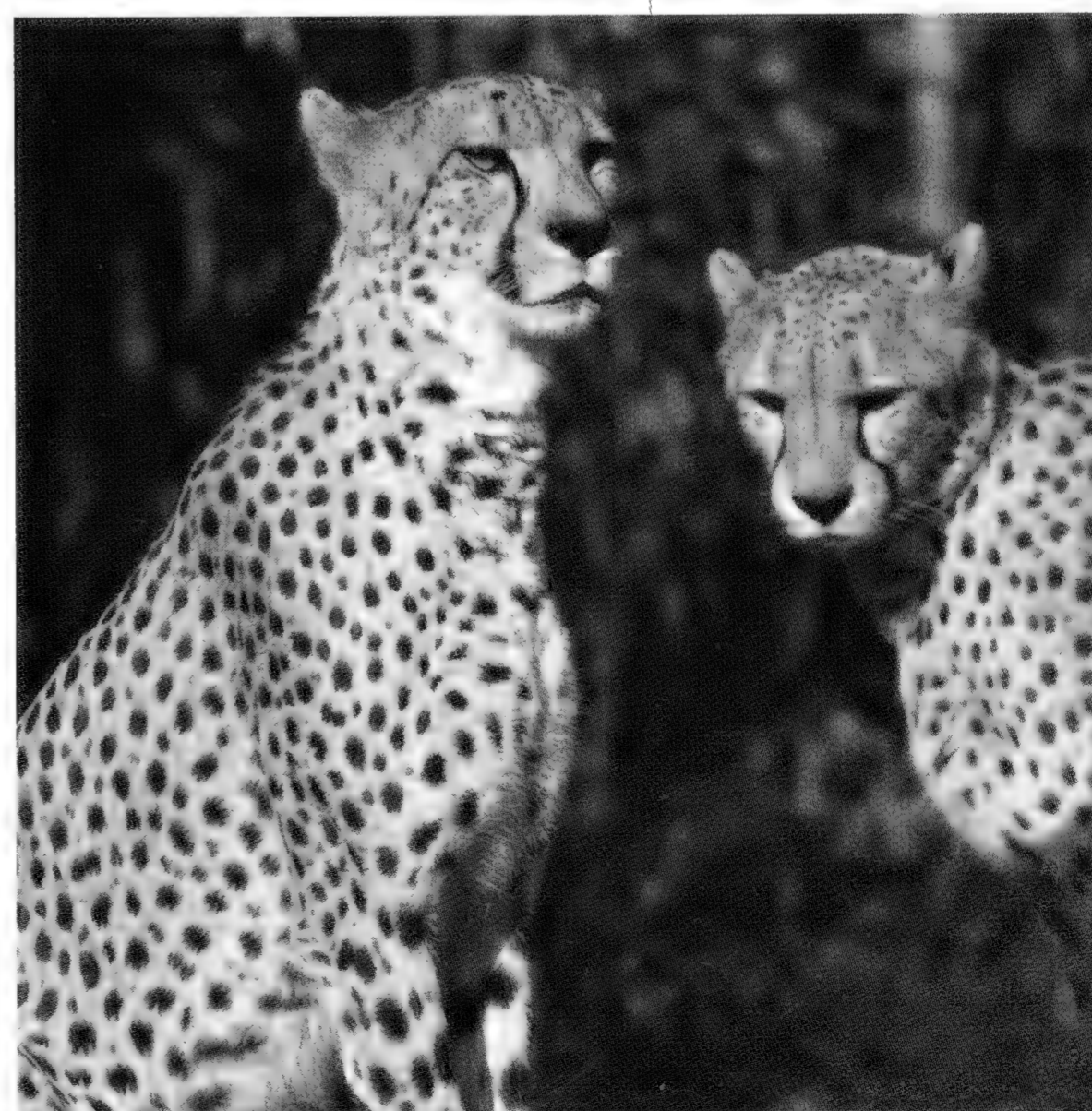
Escape Artists

How would you escape a hungry harpy eagle if you were a tiny monkey? In this class we will learn about amazing animals that use their adaptations to escape or protect themselves from predators.

AGES 3-5
DATES Session 1: June 13
Session 2: June 14
TIME 9-11 a.m.
FEE \$28



JESSIE COHEN/NZP



JESSIE COHEN/NZP

FONZ

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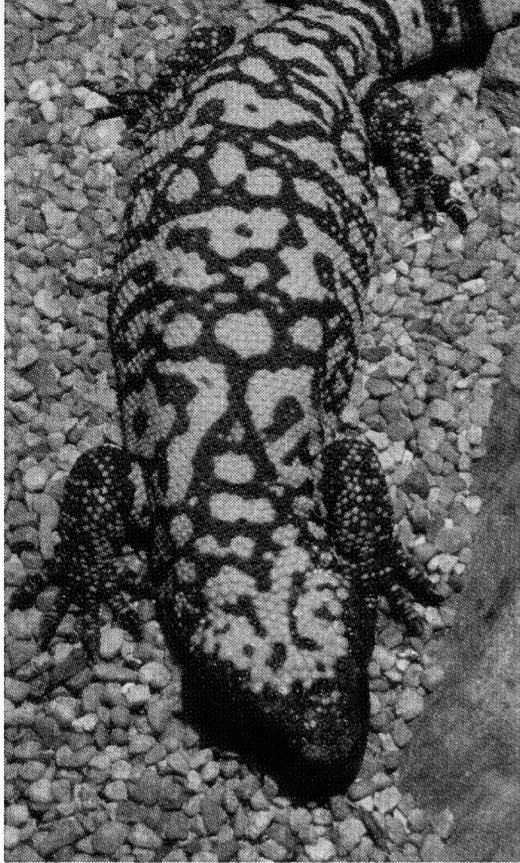
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* This listing reflects contributions from January 1 to December 31, 2008.



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Inside and Out

They're called froglets—the tiny fully formed frogs that emerge directly from the egg, skipping the tadpole stage.

The Solomon Island leaf frog is one of very few species that do this. Gel-like eggs show the various stages of the developing froglets inside, as captured by Smithsonian's National Zoo photographer Jessie Cohen. "It's amazing to be able to see everything inside the eggs," says Cohen. "And I was surprised that after I got everything lined up in place, the eggs would start moving around! That little frog inside is a living, moving creature."

Capture the Seasons

Submit your photos to **Smithsonian Zoogoer** for a photo feature that will run in our January/February 2010 issue. Photos should showcase a particular season of the year at the Zoo. Only FONZ members may participate; limit is four photo submissions per individual. Please email your photos to **zoogoer@si.edu** by November 10, 2009.



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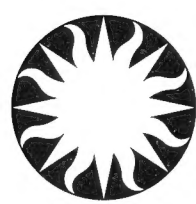
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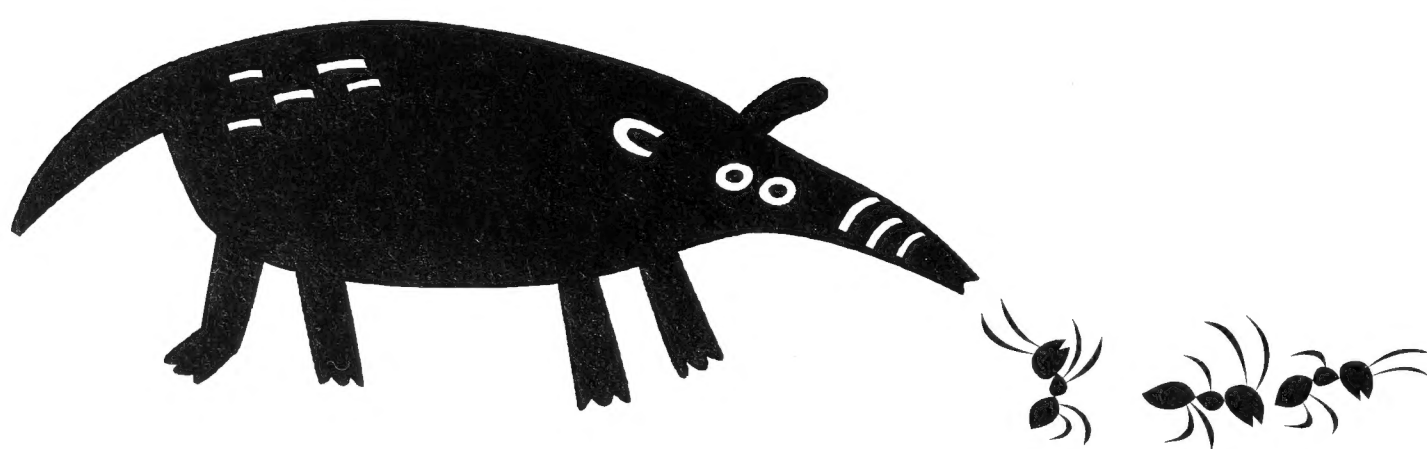
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